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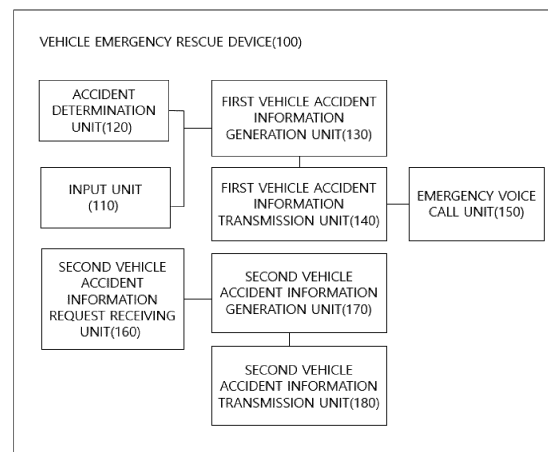
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(54) **VEHICLE EMERGENCY RESCUE DEVICE FOR TRANSMITTING EXTENDED ACCIDENT INFORMATION AND METHOD THEREOF**

(57) Disclosed are a vehicle emergency rescue device and method, the device including an input unit configured to receive a vehicle accident information transmission request based on an external input; an accident determination unit configured to determine whether a vehicle is in an accident by detecting an external shock based on information from shock detection sensors; a first vehicle accident information generation unit configured to generate first vehicle accident information when the input unit receives the vehicle accident information transmission request or when the accident determination unit determines that the vehicle is in the accident; a first vehicle accident information transmission unit configured to transmit the first vehicle accident information and an emergency call connection request to a control center; an emergency voice call unit configured to connect an emergency call to the control center in response to the emergency call connection request; a second vehicle accident information request receiving unit configured to receive a second vehicle accident information request from the control center; a second vehicle accident information generation unit configured to generate second vehicle accident information; and a second vehicle accident information transmission unit configured to transmit the second vehicle accident information to the control center.

[Fig. 1]



**EP 3 843 059 A1**

## Description

### TECHNICAL FIELD

**[0001]** The present invention relates to a vehicle emergency rescue method and device, and more particularly, to a vehicle emergency rescue method and device for, when there is a vehicle accident, primarily transmitting minimum vehicle accident information (hereinafter, referred to as first vehicle accident information) to a control center and connecting an emergency call to the control center and, when there is a request from the control center, additionally transmitting extended accident information (hereinafter, referred to as second vehicle accident information) and an image to the control center.

### BACKGROUND ART

**[0002]** An emergency call (eCall) is a service, in which an eCall terminal transmits an accident location, accident information, and the like to a control center (e.g., a Public Safety Answering Point (PSAP)) or an emergency rescue agency (e.g., 119, 112, or the like) and requests emergency rescue when there is a vehicle accident or when a driver presses an eCall button so that quick and efficient emergency measure is executed. Recently, a bill that would compel a vehicle to be equipped with an eCall system has been carried out or promoted all over the world. An eCall system includes an in-vehicle system (IVS), a mobile network operator (MNO) corresponding to a major wireless provider, and a PSAP corresponding to a control center. In other words, an eCall system basically uses a mobile communication network.

**[0003]** In an eCall system, an eCall terminal transmits standardized minimum accident information (e.g., a minimum set of data (MSD) to a control center when there is a vehicle accident, and the control center dispatches an ambulance or a fire engine to the scene of the accident in association with emergency rescue agencies, such as 119 and 112, based on the minimum accident information.

**[0004]** However, it is difficult to correctly determine the situation on the ground only with the minimum accident information. In this case, after the minimum accident information is transmitted to the control center, additional information for determining the severity of the accident and the severity of an injury may be obtained through an emergency call connection to the control center. However, it is difficult to obtain the additional information because a driver is highly likely to be unable to have normal telephone conversation because of the accident.

### DESCRIPTION OF EMBODIMENTS

#### TECHNICAL PROBLEM

**[0005]** The present invention is provided to respond to the technical problems described above. The object of

the present invention is to substantially compensate for various problems occurring due to the limits and disadvantages of the prior art. The present invention provides a vehicle emergency rescue method and device for primarily transmitting minimum vehicle accident information to a control center and connecting an emergency call to the control center and additionally transmitting extended accident information and an image to the control center when there is a request from the control center and also provides a computer-readable recording medium having recorded thereon a program for executing the method.

#### SOLUTION TO PROBLEM

**[0006]** According to an embodiment of the present invention, a vehicle emergency rescue method includes receiving, performed by an input unit, a vehicle accident information transmission request based on an external input; determining, performed by an accident determination unit, whether a vehicle is in an accident by detecting an external shock based on information from shock detection sensors; generating, performed by a first vehicle accident information generation unit, first vehicle accident information when the input unit receives the vehicle accident information transmission request or when the accident determination unit determines that the vehicle is in the accident; transmitting, performed by a first vehicle accident information transmission unit, the first vehicle accident information and an emergency call connection request to a control center; connecting, performed by an emergency voice call unit, an emergency call to the control center in response to the emergency call connection request; receiving, performed by a second vehicle accident information request receiving unit, a second vehicle accident information request from the control center; generating, performed by a second vehicle accident information generation unit, second vehicle accident information; and transmitting, performed by a second vehicle accident information transmission unit, the second vehicle accident information to the control center in response to the second vehicle accident information request.

**[0007]** According to an embodiment of the present invention, the first vehicle accident information includes at least one selected from a vehicle type, a vehicle number, an accident occurrence time, an accident occurrence location, a vehicle azimuth, a vehicle receiving phone number, the number of passengers, vehicle fuel information, a first time before the accident, a vehicle location at the first time before the accident, a second time before the accident, and a vehicle location at the second time before the accident.

**[0008]** According to an embodiment of the present invention, the second vehicle accident information includes at least one selected from an airbag state, a seatbelt state, a door open state, and vehicle movement information; and the vehicle movement information includes at least one selected from a longitudinal acceleration in a

vehicle traveling direction, a lateral acceleration in the vehicle traveling direction, a latitude of a vehicle location, a longitude of the vehicle location, vehicle attitude information, a vehicle azimuth, a vehicle speed, a vehicle revolutions per minute (RPM), and a brake state, which are acquired at a predetermined time interval during a predetermined third time.

**[0009]** According to an embodiment of the present invention, the vehicle emergency rescue method further includes setting, performed by the second vehicle accident information generation unit, the predetermined third time to include a predetermined preceding time and a predetermined succeeding time on the basis of a time when the input unit receives the vehicle accident information transmission request or a time when the accident determination unit determines that there is the accident.

**[0010]** According to an embodiment of the present invention, the vehicle emergency rescue method further includes receiving, performed by the input unit, a cancellation input within a predetermined fourth time when the input unit receives the vehicle accident information transmission request, the cancellation input cancelling the vehicle accident information transmission request, wherein the transmitting of the first vehicle accident information and the emergency call connection request to the control center includes transmitting the first vehicle accident information and the emergency call connection request to the control center when the predetermined fourth time elapses since the reception of the vehicle accident information transmission request in the case where the input unit does not receive the cancellation input within the predetermined fourth time.

**[0011]** According to an embodiment of the present invention, the vehicle emergency rescue method further includes receiving, performed by an image request receiving unit, an image request from the control center; generating, performed by an image generation unit, an image; and transmitting, performed by an image transmission unit, the image to the control center in response to the image request.

**[0012]** According to an embodiment of the present invention, the transmitting of the first vehicle accident information and the emergency call connection request to the control center includes transmitting a message respectively indicating support or non-support for the second vehicle accident information and the image to the control center.

**[0013]** According to an embodiment of the present invention, the receiving of the image request from the control center includes receiving the image request from the control center using a Session Initiation Protocol (SIP); and the transmitting of the image to the control center includes transmitting the image to the control center using a Message Session Relay Protocol (MSRP) or a Real-Time Streaming Protocol (RTSP).

**[0014]** According to an embodiment of the present invention, the transmitting of the second vehicle accident information to the control center includes transmitting the

second vehicle accident information to the control center using a Session Initiation Protocol (SIP).

**[0015]** According to an embodiment of the present invention, there is provided a computer-readable recording medium having recorded thereon a program for executing the method.

**[0016]** According to an embodiment of the present invention, a vehicle emergency rescue device includes an input unit configured to receive a vehicle accident information transmission request based on an external input; an accident determination unit configured to determine whether a vehicle is in an accident by detecting an external shock based on information from shock detection sensors; a first vehicle accident information generation unit configured to generate first vehicle accident information when the input unit receives the vehicle accident information transmission request or when the accident determination unit determines that the vehicle is in the accident; a first vehicle accident information transmission unit configured to transmit the first vehicle accident information and an emergency call connection request to a control center; an emergency voice call unit configured to connect an emergency call to the control center in response to the emergency call connection request; a second vehicle accident information request receiving unit configured to receive a second vehicle accident information request from the control center; a second vehicle accident information generation unit configured to generate second vehicle accident information; and a second vehicle accident information transmission unit configured to transmit the second vehicle accident information to the control center in response to the second vehicle accident information request.

#### ADVANTAGEOUS EFFECTS OF DISCLOSURE

**[0017]** According to the present invention, when there is a vehicle accident, standardized minimum vehicle accident information is transmitted to a control center and an emergency call is connected, and at the request of the control center, extended accident information and an image are additionally transmitted to the control center, so that the control center or associated emergency rescue agencies may accurately determine the situation of the scene of the accident and investigate the cause of the accident.

**[0018]** According to the present invention, a control center or associated emergency rescue agencies may identify the severity of serious or slight injuries of passengers and the severity of an accident using extended accident information and an image, determine the number of ambulances to be dispatched, and accurately determine whether to dispatch a fire engine, a special ambulance, and special equipment when there is a fire or a vehicle is overturned, thereby efficiently taking vehicle emergency rescue measures.

**[0019]** According to the present invention, a control center or associated emergency rescue agencies may

identify the movement of a vehicle before and after an accident using extended accident information and an image in addition to vehicle accident information at the time of the accident, thereby accurately investigating the cause of the accident.

## BRIEF DESCRIPTION OF DRAWINGS

### [0020]

FIG. 1 is a schematic block diagram of a vehicle emergency rescue device according to an embodiment of the present invention.

FIG. 2 shows second vehicle accident information according to an embodiment of the present invention.

FIG. 3 schematically shows a generation time and interval of the second vehicle accident information, according to an embodiment of the present invention.

FIG. 4 schematically shows a first vehicle accident information transmission procedure according to an embodiment of the present invention.

FIG. 5 shows a message respectively indicating support or non-support for a second vehicle accident information and an image in detail, according to an embodiment of the present invention.

FIG. 6 schematically shows a second vehicle accident information transmission procedure according to an embodiment of the present invention.

FIG. 7 shows a second vehicle accident information request message and a second vehicle accident information message, according to an embodiment of the present invention.

FIG. 8 schematically shows an image transmission procedure according to an embodiment of the present invention.

FIG. 9 shows an image request message and an image request acknowledgement message, according to an embodiment of the present invention.

FIG. 10 shows an image message and an image acknowledgement message, according to an embodiment of the present invention.

FIG. 11 is a schematic flowchart of a vehicle emergency rescue method according to an embodiment of the present invention.

## BEST MODE

[0021] Hereinafter, embodiments will be described in detail with reference to the accompanying drawings. In the drawing, like reference numerals denote like elements, and the size of each element may be exaggerated for the clarity of description.

[0022] FIG. 1 is a schematic block diagram of a vehicle emergency rescue device according to an embodiment of the present invention.

[0023] According to an embodiment of the present in-

vention, a vehicle emergency rescue device 100 includes an input unit 110, an accident determination unit 120, a first vehicle accident information generation unit 130, a first vehicle accident information transmission unit 140, an emergency voice call unit 150, a second vehicle accident information request receiving unit 160, a second vehicle accident information generation unit 170, and a second vehicle accident information transmission unit 180.

10 [0024] The input unit 110 receives a vehicle accident information transmission request based on an external input.

[0025] The accident determination unit 120 determines whether a vehicle is in an accident by detecting an external shock based on information from shock detection sensors.

15 [0026] The first vehicle accident information generation unit 130 generates first vehicle accident information when the input unit 100 receives the vehicle accident information transmission request or when the accident determination unit 120 determines that the vehicle is in an accident. The first vehicle accident information includes at least one selected from a vehicle type, a vehicle number, an accident occurrence time, an accident occurrence location, a vehicle azimuth, a vehicle receiving phone number, the number of passengers, vehicle fuel information, a first time before an accident, a vehicle location at the first time before an accident, a second time before an accident, and a vehicle location at the second time before an accident. For example, the first time before an accident may be five seconds before an accident, and the second time before an accident may be 10 seconds before an accident, but it is apparent to those skilled in the art that the first and second times may be set to other times.

20 [0027] The first vehicle accident information transmission unit 140 transmits the first vehicle accident information and an emergency call connection request to a control center. According to the present embodiment, the first vehicle accident information transmission unit 140 transmits the first vehicle accident information to the control center using Next Generation eCall (NG eCall) or Constrained Application Protocol (CoAP).

25 [0028] The NG eCall is a European standard that defines a vehicle accident information transmission protocol between a vehicle emergency rescue device and a control center, and the CoAP is a Korean standard (ITSK-00106-1) established by Intelligent Transport Society of Korea (ITSK) for the same purpose. In detail, the NG eCall adds data for transmission of vehicle accident information to a stage of connecting a call using signal information of Session Initiation Protocol (SIP) and media information of Session Description Protocol (SDP) and has been standardized as IETF RFC 8147. Therefore, according to the present embodiment, the first vehicle accident information transmission unit 140 uses the SIP and the SDP. The CoAP does not use the SIP and the SDP but encodes vehicle accident information and trans-

mits encoded information using User Datagram Protocol (UDP).

**[0029]** The emergency voice call unit 150 connects an emergency call to the control center in response to the emergency call connection request. According to the present embodiment, the emergency voice call unit 150 connects the emergency call to the control center using Real-Time Transport Protocol (RTP) and RTP Control Protocol (RTCP).

**[0030]** The vehicle emergency rescue device 100 may further include a physical layer unit (not shown). The physical layer unit connects communications by implementing wireless mobile communication technology including 2G, 3G, LTE, and 5G or implementing Wireless Access in Vehicular Environments (WAVE) technology using a radio frequency in a 5.8 GHz unlicensed band. The WAVE technology has been standardized as IEEE 802.11p and is standard technology of amending a media access control (MAC) layer and a physical layer (PHY) by adding wireless access in vehicular environments to the wireless local area network (LAN) standard IEEE 802.11. IEEE 802.11p defines an outside context of BSS (OCB) that enables communication without scanning, authentication, and association procedures for inter-node communication of IEEE 802.11.

**[0031]** The vehicle emergency rescue device 100 may further include an output unit (not shown). It is apparent to those skilled in the art that the output unit may be implemented in various output modes including LED and text/video/image/voice outputs. The output unit outputs a vehicle emergency rescue state when a vehicle emergency rescue begins or is in progress, such as when the input unit 110 receives the vehicle accident information transmission request, when the accident determination unit 120 determines that there is an accident, when the first vehicle accident information transmission unit 140 transmits the first vehicle accident information and the emergency call connection request to a control center, or when the emergency voice call unit 150 connects an emergency call to the control center.

**[0032]** The second vehicle accident information request receiving unit 160 receives a second vehicle accident information request from the control center.

**[0033]** The second vehicle accident information generation unit 170 generates second vehicle accident information. The second vehicle accident information is described in detail below with reference to FIG. 2.

**[0034]** The second vehicle accident information transmission unit 180 transmits the second vehicle accident information to the control center.

**[0035]** A detailed procedure for receiving the second vehicle accident information request from the control center and transmitting the second vehicle accident information to the control center is described below with reference to FIG. 6.

**[0036]** FIG. 2 shows second vehicle accident information according to an embodiment of the present invention.

**[0037]** The vehicle emergency rescue device 100 re-

ceives a second vehicle accident information request from a control center and generates second vehicle accident information. As shown in FIG. 2, the second vehicle accident information includes at least one selected from an airbag state, a seatbelt state, a door open state, and vehicle movement information. The airbag state is information about deployment or non-deployment of an airbag, the seatbelt state is information about fastening or unfastening of a seatbelt, and the door open state is information about an open state of a vehicle door. The vehicle movement information is a set of items of information acquired at a predetermined time interval during a predetermined third time. The predetermined third time and the predetermined time interval are described in detail below with reference to FIG. 3. In an example shown in FIG. 3, because the predetermined third time is 30 seconds and the predetermined time interval is one second, the vehicle emergency rescue device 100 acquires the vehicle movement information at intervals of one second during 30 seconds.

**[0038]** The vehicle movement information includes at least one selected from a longitudinal acceleration in a vehicle traveling direction, a lateral acceleration in a vehicle traveling direction, the latitude of a vehicle location, the longitude of a vehicle location, vehicle attitude information, a vehicle azimuth, a vehicle speed, a vehicle revolutions per minute (RPM), and a brake state, which are acquired at a predetermined time interval during a predetermined third time. The vehicle attitude information represents the attitude of a vehicle with three-axis information, i.e., roll, pitch, and yaw. The brake state represents an on/off state of a vehicle brake.

**[0039]** FIG. 3 schematically shows a generation time and interval of vehicle movement information in second vehicle accident information, according to an embodiment of the present invention.

**[0040]** The second vehicle accident information generation unit 170 of the vehicle emergency rescue device 100 may set the predetermined third time described above with reference to FIG. 2 to include a predetermined preceding time and a predetermined succeeding time on the basis of a time (or a manual event generation time) when the input unit 110 receives the vehicle accident information transmission request or a time (or an automatic event generation time) when the accident determination unit 120 determines that there is an accident. In the example shown in FIG. 3, the predetermined third time is set to 30 seconds including a time T1 of preceding 20 seconds and a time T2 of succeeding 10 seconds on the basis of the time when the input unit 110 receives the vehicle accident information transmission request or the time when the accident determination unit 120 determines that there is an accident. In the example shown in FIG. 3, the predetermined time interval is set to one second. Accordingly, the second vehicle accident information generation unit 170 of the vehicle emergency rescue device 100 generates the vehicle movement information of the second vehicle accident information at intervals of

one second for 30 seconds before and after the manual event generation time or the automatic event generation time. In another embodiment, the predetermined third time may be set to a variable time including the time T1 of preceding 20 seconds on the basis of the time when the accident determination unit 120 determines that there is an accident and the time T2 when an emergency call is connected to the control center thereafter. For example, the second vehicle accident information generation unit 170 of the vehicle emergency rescue device 100 may generate the vehicle movement information of the second vehicle accident information at a predetermined time interval (e.g., one second) for 25 seconds, which include the time T1 of preceding 20 seconds on the basis of the automatic event generation time and the time T2 of 5 seconds till the connection of an emergency call since the automatic event generation time.

**[0041]** When a second vehicle accident information request is received from the control center, the vehicle emergency rescue device 100 transmits the second vehicle accident information to the control center. A procedure for transmitting the second vehicle accident information is described below with reference to FIG. 6.

**[0042]** The vehicle emergency rescue device 100 generates first vehicle accident information when the input unit 110 receives the vehicle accident information transmission request or when the accident determination unit 120 determines that there is an accident. When the input unit 110 of the vehicle emergency rescue device 100 receives the vehicle accident information transmission request, the input unit 110 may receive a cancellation input, which cancels the vehicle accident information transmission request, within a predetermined fourth time. When the input unit 110 does not receive the cancellation input within the predetermined fourth time, the first vehicle accident information transmission unit 140 transmits the first vehicle accident information and the emergency call connection request to the control center when the predetermined fourth time elapses since the reception of the vehicle accident information transmission request.

**[0043]** In the example shown in FIG. 3, the predetermined fourth time is 10 seconds, and accordingly, when the input unit 110 does not receive a cancellation input, which cancels the vehicle accident information transmission request, within 10 seconds after receiving the vehicle accident information transmission request, the first vehicle accident information transmission unit 140 transmits the first vehicle accident information and the emergency call connection request to the control center when 10 seconds elapses since the reception of the vehicle accident information transmission request.

**[0044]** According to the present embodiment, when a manual event of receiving a vehicle accident information transmission request occurs because of a mistake or mischief made by a driver or a child in a vehicle with no relation to a vehicle accident, this may be regarded as a fake vehicle emergency rescue situation and managed by enabling the vehicle emergency rescue device 100 to

receive cancellation of the vehicle accident information transmission request within the predetermined fourth time. The vehicle emergency rescue device 100 may reduce the frequency of occurrence of fake vehicle emergency rescue by informing a driver of the generation of a manual event and allowing the driver to cancel the manual event. Consequently, the control center is prevented from wasting time and resources on a fake vehicle emergency rescue situation.

**[0045]** FIG. 4 schematically shows a first vehicle accident information transmission procedure according to an embodiment of the present invention.

**[0046]** The first vehicle accident information transmission unit 140 transmits first vehicle accident information generated by the first vehicle accident information generation unit 130 and an emergency call connection request to a control center in operation 410. In an example shown in FIG. 4, the vehicle emergency rescue device 100 transmits the first vehicle accident information and the emergency call connection request to the control center using NG eCall and SIP, which is an IP-based voice call standard. The SIP has been standardized as Internet Engineering Task Force (IETF) RFC 3261. The vehicle emergency rescue device 100 includes the first vehicle accident information in an SIP INVITE message and transmits the SIP INVITE message to the control center. An example of the SIP INVITE message is shown in FIG. 5.

**[0047]** The vehicle emergency rescue device 100 receives a reception success message (e.g., SIP 200 OK) from the control center with respect to the first vehicle accident information and the emergency call connection request in operation 420.

**[0048]** The vehicle emergency rescue device 100 transmits acknowledgement (ACK) to the control center in operation 430 and connects an emergency call to the control center in operation 440. The emergency voice call unit 150 of the vehicle emergency rescue device 100 connects the emergency call to the control center using RTP and RTCP.

**[0049]** FIG. 5 shows a message respectively indicating support or non-support for a second vehicle accident information and an image in detail, according to an embodiment of the present invention.

**[0050]** As described above with reference to FIG. 4, the first vehicle accident information transmission unit 140 transmits first vehicle accident information and an emergency call connection request to a control center. FIG. 5 shows an example of an SIP INVITE message, which includes the first vehicle accident information and the emergency call connection request. The SIP INVITE message includes an SIP portion for signal data transmission, an SDP portion for media data transmission, and the first vehicle accident information. The first vehicle accident information has a format according to the NG eCall standard. The first vehicle accident information may be encoded according to Abstract Syntax Notation One Packed Encoding Rules (ASN.1 PER) and Concise Bi-

nary Object Representation (CBOR), but it is apparent to those skilled in the art that the first vehicle accident information may be encoded using other methods.

**[0051]** According to an embodiment, the first vehicle accident information transmission unit 140 also transmits a message respectively indicating support or non-support for the second vehicle accident information and the image to the control center. In the example shown in FIG. 5, the SIP INVITE message includes the capabilities of the vehicle emergency rescue device 100, which include support or non-support for the second vehicle accident information and support or non-support for the image. The control center may identify the functions, which are supported by the vehicle emergency rescue device 100, based on corresponding information. In the case where the second vehicle accident information and the image are supported by the vehicle emergency rescue device 100, a counselor of the control center may request the second vehicle accident information or the image from the vehicle emergency rescue device 100 by activating a second vehicle accident information request button or an image request button when necessary during an emergency call. In the example shown in FIG. 5, support for first vehicle accident information is stated as "eCall.MSD", support for second vehicle accident information is stated as "eCall.xMSD", and support for an image is stated as "eCall.Image". In the example shown in FIG. 5, support or non-support for second vehicle accident information and support or non-support for an image are written into the SIP INVITE message, but it is apparent to those skilled in the art that other messages may be used.

**[0052]** FIG. 6 schematically shows a second vehicle accident information transmission procedure according to an embodiment of the present invention.

**[0053]** The second vehicle accident information request receiving unit 160 of the vehicle emergency rescue device 100 receives a second vehicle accident information request from a control center in operation 620. The second vehicle accident information request is written into an SIP INFO message, but it is apparent to those skilled in the art that other messages may be used. The SIP INFO message has been standardized as IETF RFC 6086.

**[0054]** The second vehicle accident information generation unit 170 generates second vehicle accident information.

**[0055]** The second vehicle accident information transmission unit 180 transmits the second vehicle accident information to the control center in operation 640.

**[0056]** The detailed message content of the second vehicle accident information request and the second vehicle accident information is described below with reference to FIG. 7.

**[0057]** FIG. 7 shows a second vehicle accident information request message and a second vehicle accident information message, according to an embodiment of the present invention.

**[0058]** In an example shown in FIG. 7, a second vehicle accident information request received from a control center is written into an SIP INFO message 710. In the SIP INFO message 710, a request action is set to "send-data", and a data type is set to "eCall.xMSD".

**[0059]** The second vehicle accident information generation unit 170 encodes and transmits second vehicle accident information 720 to the control center. In the example shown in FIG. 7, the second vehicle accident information generation unit 170 encodes the second vehicle accident information 720 using ASN.1 PER, but it is apparent to those skilled in the art that other encoding methods including CBOR may be used. The second vehicle accident information 720 is defined in advance by the ASN.1 format, and the definition is shared in advance by the vehicle emergency rescue device 100 and the control center, so that there is no problem for the vehicle emergency rescue device 100 and the control center to interpret data transferred therebetween. The second vehicle accident information generation unit 170 writes the second vehicle accident information 720 into an SIP INFO message 730 and transmits the SIP INFO message 730 to the control center. The SIP INFO message 730 includes "eCall.xMSD" in each of a Content-Type header, an Info-Package header, and a Call-Info header.

**[0060]** FIG. 8 schematically shows an image transmission procedure according to an embodiment of the present invention.

**[0061]** The vehicle emergency rescue device 100 includes an image request receiving unit (not shown), an image generation unit (not shown), and an image transmission unit (not shown).

**[0062]** The image request receiving unit receives an image request from a control center in operation 820. The image request receiving unit receives the image request from the control center using the SIP. In an example shown in FIG. 8, during an emergency call connection, the control center transmits the image request using an SIP RE-INVITE message. The image request includes at least one selected from a maximum file size, a file type (e.g., jpeg, gif, or the like.), a file encoding method (e.g., base64 or the like), a transmission protocol (e.g., Transmission Control Protocol (TCP), UDP, Transport Layer Security (TLS), or the like), a receiving port, and a file transmission direction, which are acceptable by the control center.

**[0063]** The vehicle emergency rescue device 100 transmits a reception success message (e.g., SIP 200 OK) to the control center with respect to the image request from the control center in operation 830. The reception success message includes at least one selected from the type and the size of a file to be transmitted by the vehicle emergency rescue device 100, a file encoding method, a transmission protocol, and a file transmission direction. Basically, the vehicle emergency rescue device 100 sends an image based on information processable by the control center with reference to the image request. However, when the vehicle emergency rescue

device 100 does not support an image, the vehicle emergency rescue device 100 transmits a receiving failure message.

**[0064]** The image generation unit generates an image. The image may be generated by performing image capturing using a camera of the vehicle emergency rescue device 100, but it is apparent to those skilled in the art that the image may be generated using other methods. The inside or outside of an accident vehicle may be photographed by the camera, and an infrared function or a flash function may be included to be ready for accidents at night. The image includes a still image and a moving image. The still image may be stored in various formats such as JPEG and GIF and may have a resolution of at least VGA(640\*480) so that the control center may perform an accurate analysis. The image generation unit basically generates an image based on information processable by the control center with reference to the image request.

**[0065]** TCP connection is set for image transmission in operation 850. In the present embodiment, the image is transmitted through TCP connection, but it is apparent to those skilled in the art that the image may be transmitted using other transmission protocols such as UDP and TLS.

**[0066]** The image transmission unit transmits the image to the control center in response to the image request in operations 860 and 870. The image may be transmitted in predetermined byte units for efficient transmission and may be cancelled during transmission. In addition, the image may be encoded using base64, but it is apparent to those skilled in the art that the image may be encoded using other methods. In the present embodiment, the image transmission unit transmits the image to the control center using Message Session Relay Protocol (MSRP) or Real-Time Streaming Protocol (RTSP), but it is apparent to those skilled in the art that other protocols such as File Transfer Protocol (FTP) may be used. The MSRP has been standardized as IETF RFC4975, and the RTSP has been standardized as IETF RFC2326. For example, a still image may be transmitted using the MSRP, and a moving image may be transmitted in real time using the RTSP. In addition, when video-related information is added to an SIP RE-INVITE message, the image may be transmitted through a video call.

**[0067]** The control center transmits an acknowledgement of the image, which includes image reception success or failure, to the vehicle emergency rescue device 100 in operation 880. The acknowledgement of the image may be written into an MSRP REPORT message, but it is apparent to those skilled in the art that other messages may be used. When the vehicle emergency rescue device 100 receives the acknowledgement of the image, the vehicle emergency rescue device 100 terminates the connection (e.g., TCP connection) for image transmission. The vehicle emergency rescue device 100 newly performs connection for image transmission at each request of the control center and terminates the connection

when image transmission is completed.

**[0068]** According to the present embodiment, the control center may determine the severity of an accident and the severity of an injury using the image transmitted by the vehicle emergency rescue device 100. In other words, the control center may identify the serious and slight injuries of passengers using the image and determine the number of ambulances to be dispatched and may accurately determine whether to dispatch a fire engine, a special ambulance, and special equipment when there is a fire or a vehicle is overturned, thereby efficiently taking vehicle emergency rescue measures.

**[0069]** FIG. 9 shows an image request message and an image request acknowledgement message, according to an embodiment of the present invention.

**[0070]** In an example shown in FIG. 9, an image request, which is transmitted by a control center during an emergency call connection, is shown. In the example shown in FIG. 9, the image request is written using an SIP RE-INVITE message 910. The SIP RE-INVITE message 910 includes "m=message 7000 TCP/MSRP" and thus informs the control center that the image will be transmitted using the MSRP.

**[0071]** The vehicle emergency rescue device 100 transmits a reception success message to the control center in response to the image request from the control center. In the example shown in FIG. 9, the reception success message is written as SIP 200 OK 920.

**[0072]** FIG. 10 shows an image message and an image acknowledgement message, according to an embodiment of the present invention.

**[0073]** In an example shown in FIG. 10, the image transmission unit divides an image 1010 into messages of a predetermined byte unit and transmits the image 1010 using the MSRP. Each message includes the size of a full file, the size of a file included in the current message, and a position in the full file. A control center may merge the messages into the full file using information included in each of the messages.

**[0074]** The control center transmits an acknowledgement of the image to the vehicle emergency rescue device 100, wherein the acknowledgement of the image includes an image reception success or failure. In the example shown in FIG. 10, the acknowledgement of the image written into an MSRP REPORT message 1020 is shown.

**[0075]** FIG. 11 is a schematic flowchart of a vehicle emergency rescue method according to an embodiment of the present invention.

**[0076]** The vehicle emergency rescue device 100 receives a vehicle accident information transmission request, using the input unit 110, based on an external input in operation 1110.

**[0077]** The vehicle emergency rescue device 100 determines, using the accident determination unit 120, whether a vehicle is in an accident by detecting an external shock based on information from shock detection sensors in operation 1120. The shock detection sensors



include at least one selected from an airbag deployment sensor, a 2-axis acceleration sensor, a 3-axis acceleration sensor, a 3-axis gyro sensor, and an azimuth sensor.

**[0078]** When the vehicle emergency rescue device 100 receives the vehicle accident information transmission request using the input unit 110 or determines that there is an accident in operation 1130 using the accident determination unit 120, the vehicle emergency rescue device 100 proceeds to operation 1140.

**[0079]** The vehicle emergency rescue device 100 generates first vehicle accident information using the first vehicle accident information generation unit 130 in operation 1140. The first vehicle accident information includes at least one selected from a vehicle type, a vehicle number, an accident occurrence time, an accident occurrence location, a vehicle azimuth, a vehicle receiving phone number, the number of passengers, vehicle fuel information, a first time before an accident, a vehicle location at the first time before an accident, a second time before an accident, and a vehicle location at the second time before an accident. The generating of the first vehicle accident information includes generating a message respectively indicating support or non-support for a second vehicle accident information and an image.

**[0080]** The vehicle emergency rescue device 100 transmits the first vehicle accident information and an emergency call connection request to a control center using the first vehicle accident information transmission unit 140 in operation 1150. The transmitting of the first vehicle accident information and the emergency call connection request to the control center includes transmitting a message respectively indicating for support or non-support for the second vehicle accident information and the image to the control center.

**[0081]** The vehicle emergency rescue device 100 connects an emergency call to the control center in response to the emergency call connection request using the emergency voice call unit 150 in operation 1160.

**[0082]** The vehicle emergency rescue device 100 receives a second vehicle accident information request from the control center using the second vehicle accident information request receiving unit 160 in operation 1170.

**[0083]** The vehicle emergency rescue device 100 generates second vehicle accident information using the second vehicle accident information generation unit 170 in operation 1180. The second vehicle accident information includes at least one selected from an airbag state, a seatbelt state, a door open state, and vehicle movement information. The vehicle movement information includes at least one selected from a longitudinal acceleration in a vehicle traveling direction, a lateral acceleration in a vehicle traveling direction, the latitude of a vehicle location, the longitude of a vehicle location, vehicle attitude information, a vehicle azimuth, a vehicle speed, a vehicle RPM, and a brake state, which are acquired at a predetermined time interval during a predetermined third time.

**[0084]** The vehicle emergency rescue device 100 may set the predetermined third time to include a predeter-

mined preceding time and a predetermined succeeding time on the basis of a time when the input unit 110 receives the vehicle accident information transmission request or a time when the accident determination unit 120 determines that there is an accident, using the second vehicle accident information generation unit 170. For example, the predetermined third time may be set to 30 seconds including the time T1 of preceding 20 seconds and the time T2 of succeeding 10 seconds on the basis of the time when the input unit 110 receives the vehicle accident information transmission request or the time when the accident determination unit 120 determines that there is an accident. The predetermined time interval may be set to one second. Accordingly, in this case, the second vehicle accident information generation unit 170 of the vehicle emergency rescue device 100 generates the vehicle movement information of the second vehicle accident information at intervals of one second for 30 seconds before and after the reception time or the time when the accident determination unit 120 determines that there is an accident.

**[0085]** The vehicle emergency rescue device 100 transmits the second vehicle accident information to the control center in response to the second vehicle accident information request using the second vehicle accident information transmission unit 180 in operation 1190. The vehicle emergency rescue device 100 transmits the second vehicle accident information to the control center using the SIP.

**[0086]** According to another embodiment of the present invention, in the case where the vehicle emergency rescue device 100 receives the vehicle accident information transmission request using the input unit 110, the vehicle emergency rescue device 100 receives a cancellation input, which cancels the vehicle accident information transmission request, within a predetermined fourth time using the input unit 110. In the case where the vehicle emergency rescue device 100 does not receive the cancellation input within the predetermined fourth time through the input unit 110, the vehicle emergency rescue device 100 transmits, using the first vehicle accident information transmission unit 140, the first vehicle accident information and the emergency call connection request to the control center when the predetermined fourth time elapses since the reception of the vehicle accident information transmission request.

**[0087]** According to another embodiment of the present invention, the vehicle emergency rescue device 100 receives an image request from the control center through an image request receiving unit. The vehicle emergency rescue device 100 receives the image request from the control center using the SIP, but it is apparent to those skilled in the art that other protocols may be used. The vehicle emergency rescue device 100 generates an image using an image generation unit. The vehicle emergency rescue device 100 transmits the image to the control center using an image generation unit in response to the image request. The vehicle emergency

rescue device 100 transmits the image to the control center using the MSRP or the RTSP, but it is apparent to those skilled in the art that other protocols may be used.

[0088] While the present invention has been particularly shown and described with reference to embodiments thereof, it will be understood that various changes in form and details may be made therein without departing from the spirit and scope of the following claims.

[0089] For example, a device according to an example embodiment of the present invention may include a bus coupled to each element of the device, at least one processor coupled to the bus, and memory coupled to the bus to store commands, received messages, or generated messages and coupled to the at least one processor which executes the commands.

[0090] The present invention can also be embodied as computer-readable code on a computer-readable recording medium. The computer-readable recording medium is any data storage device that can store data which can be thereafter read by a computer system. Examples of the computer-readable recording medium include magnetic storage media (e.g., ROM, floppy disks, hard disks, etc.) and optical recording media (e.g., CD-ROMs, or DVDs). The computer-readable recording medium can also be distributed over network coupled computer systems so that the computer-readable code is stored and executed in a distributed fashion.

## Claims

### 1. A vehicle emergency rescue device comprising:

an input unit configured to receive a vehicle accident information transmission request based on an external input;

an accident determination unit configured to determine whether a vehicle is in an accident by detecting an external shock based on information from shock detection sensors;

a first vehicle accident information generation unit configured to generate first vehicle accident information when the input unit receives the vehicle accident information transmission request or when the accident determination unit determines that the vehicle is in the accident;

a first vehicle accident information transmission unit configured to transmit the first vehicle accident information and an emergency call connection request to a control center;

an emergency voice call unit configured to connect an emergency call to the control center in response to the emergency call connection request;

a second vehicle accident information request receiving unit configured to receive a second vehicle accident information request from the control center;

a second vehicle accident information generation unit configured to generate second vehicle accident information; and

a second vehicle accident information transmission unit configured to transmit the second vehicle accident information to the control center in response to the second vehicle accident information request.

2. The vehicle emergency rescue device of claim 1, wherein the first vehicle accident information includes at least one selected from a vehicle type, a vehicle number, an accident occurrence time, an accident occurrence location, a vehicle azimuth, a vehicle receiving phone number, the number of passengers, vehicle fuel information, a first time before the accident, a vehicle location at the first time before the accident, a second time before the accident, and a vehicle location at the second time before the accident.

3. The vehicle emergency rescue device of claim 1, wherein the second vehicle accident information includes at least one selected from an airbag state, a seatbelt state, a door open state, and vehicle movement information; and the vehicle movement information includes at least one selected from a longitudinal acceleration in a vehicle traveling direction, a lateral acceleration in the vehicle traveling direction, a latitude of a vehicle location, a longitude of the vehicle location, vehicle attitude information, a vehicle azimuth, a vehicle speed, a vehicle revolutions per minute (RPM), and a brake state, which are acquired at a predetermined time interval during a predetermined third time.

4. The vehicle emergency rescue device of claim 3, wherein the second vehicle accident information generation unit sets the predetermined third time to include a predetermined preceding time and a predetermined succeeding time on the basis of a time when the input unit receives the vehicle accident information transmission request or a time when the accident determination unit determines that there is the accident.

5. The vehicle emergency rescue device of claim 1, wherein, when the input unit receives the vehicle accident information transmission request, the input unit receives a cancellation input within a predetermined fourth time, the cancellation input cancelling the vehicle accident information transmission request; and when the input unit does not receive the cancellation input within the predetermined fourth time, the first vehicle accident information transmission unit transmits the first vehicle accident information and the emergency call connection request to the control

center when the predetermined fourth time elapses since the reception of the vehicle accident information transmission request.

6. The vehicle emergency rescue device of claim 1, further comprising:

an image request receiving unit configured to receive an image request from the control center;  
an image generation unit configured to generate an image; and  
an image transmission unit configured to transmit the image to the control center in response to the image request.

7. The vehicle emergency rescue device of claim 6, wherein the first vehicle accident information transmission unit transmits a message respectively indicating support or non-support for the second vehicle accident information and the image to the control center.

8. The vehicle emergency rescue device of claim 6, wherein the image request receiving unit receives the image request from the control center using a Session Initiation Protocol (SIP); and the image transmission unit transmits the image to the control center using a Message Session Relay Protocol (MSRP) or a Real-Time Streaming Protocol (RTSP).

9. The vehicle emergency rescue device of claim 1, wherein the second vehicle accident information transmission unit transmits the second vehicle accident information to the control center using a Session Initiation Protocol (SIP).

10. A vehicle emergency rescue method comprising:

receiving, performed by an input unit, a vehicle accident information transmission request based on an external input;  
determining, performed by an accident determination unit, whether a vehicle is in an accident by detecting an external shock based on information from shock detection sensors;  
generating, performed by a first vehicle accident information generation unit, first vehicle accident information when the input unit receives the vehicle accident information transmission request or when the accident determination unit determines that the vehicle is in the accident;  
transmitting, performed by a first vehicle accident information transmission unit, the first vehicle accident information and an emergency call connection request to a control center;  
connecting, performed by an emergency voice

call unit, an emergency call to the control center in response to the emergency call connection request;

receiving, performed by a second vehicle accident information request receiving unit, a second vehicle accident information request from the control center;

generating, performed by a second vehicle accident information generation unit, second vehicle accident information; and

transmitting, performed by a second vehicle accident information transmission unit, the second vehicle accident information to the control center in response to the second vehicle accident information request.

11. The vehicle emergency rescue method of claim 10, wherein the first vehicle accident information includes at least one selected from a vehicle type, a vehicle number, an accident occurrence time, an accident occurrence location, a vehicle azimuth, a vehicle receiving phone number, the number of passengers, vehicle fuel information, a first time before the accident, a vehicle location at the first time before the accident, a second time before the accident, and a vehicle location at the second time before the accident.

12. The vehicle emergency rescue method of claim 10, wherein the second vehicle accident information includes at least one selected from an airbag state, a seatbelt state, a door open state, and vehicle movement information; and the vehicle movement information includes at least one selected from a longitudinal acceleration in a vehicle traveling direction, a lateral acceleration in the vehicle traveling direction, a latitude of a vehicle location, a longitude of the vehicle location, vehicle attitude information, a vehicle azimuth, a vehicle speed, a vehicle revolutions per minute (RPM), and a brake state, which are acquired at a predetermined time interval during a predetermined third time.

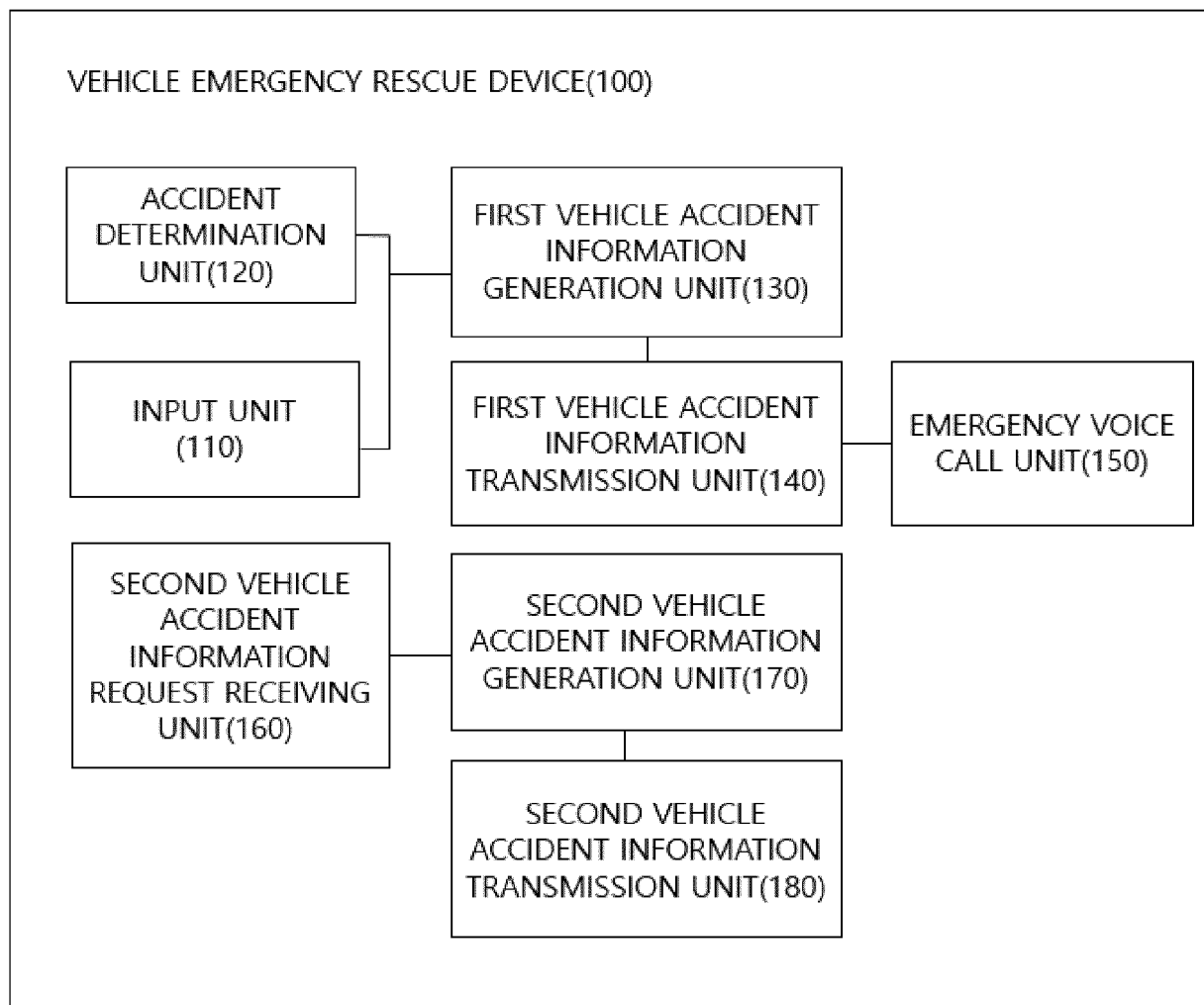
13. The vehicle emergency rescue method of claim 12, further comprising setting, performed by the second vehicle accident information generation unit, the predetermined third time to include a predetermined preceding time and a predetermined succeeding time on the basis of a time when the input unit receives the vehicle accident information transmission request or a time when the accident determination unit determines that there is the accident.

14. The vehicle emergency rescue method of claim 10, further comprising receiving, performed by the input unit, a cancellation input within a predetermined fourth time when the input unit receives the vehicle accident information transmission request, the can-

cellation input cancelling the vehicle accident information transmission request,  
 wherein the transmitting of the first vehicle accident information and the emergency call connection request to the control center includes transmitting the first vehicle accident information and the emergency call connection request to the control center when the predetermined fourth time elapses since the reception of the vehicle accident information transmission request in the case where the input unit does not receive the cancellation input within the predetermined fourth time.

15. The vehicle emergency rescue method of claim 10, further comprising:
  - receiving, performed by an image request receiving unit, an image request from the control center;
  - generating, performed by an image generation unit, an image; and
  - transmitting, performed by an image transmission unit, the image to the control center in response to the image request.
16. The vehicle emergency rescue method of claim 15, wherein the transmitting of the first vehicle accident information and the emergency call connection request to the control center includes transmitting a message respectively indicating support or non-support for the second vehicle accident information and the image to the control center.
17. The vehicle emergency rescue method of claim 15, wherein the receiving of the image request from the control center includes receiving the image request from the control center using a Session Initiation Protocol (SIP); and  
 the transmitting of the image to the control center includes transmitting the image to the control center using a Message Session Relay Protocol (MSRP) or a Real-Time Streaming Protocol (RTSP).
18. The vehicle emergency rescue method of claim 10, wherein the transmitting of the second vehicle accident information to the control center includes transmitting the second vehicle accident information to the control center using a Session Initiation Protocol (SIP).
19. A computer-readable recording medium having recorded thereon a program for executing the method of any one of claims 10 through 18.

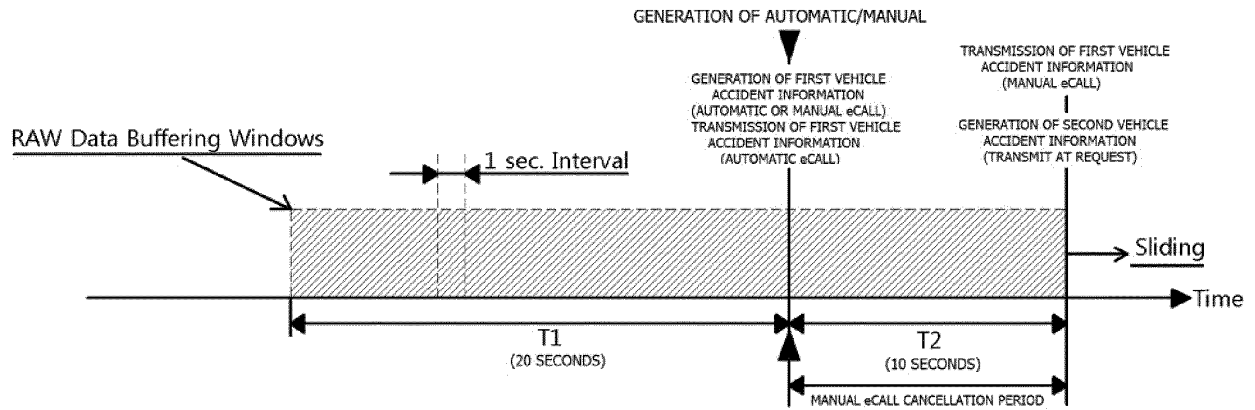
【Fig. 1】



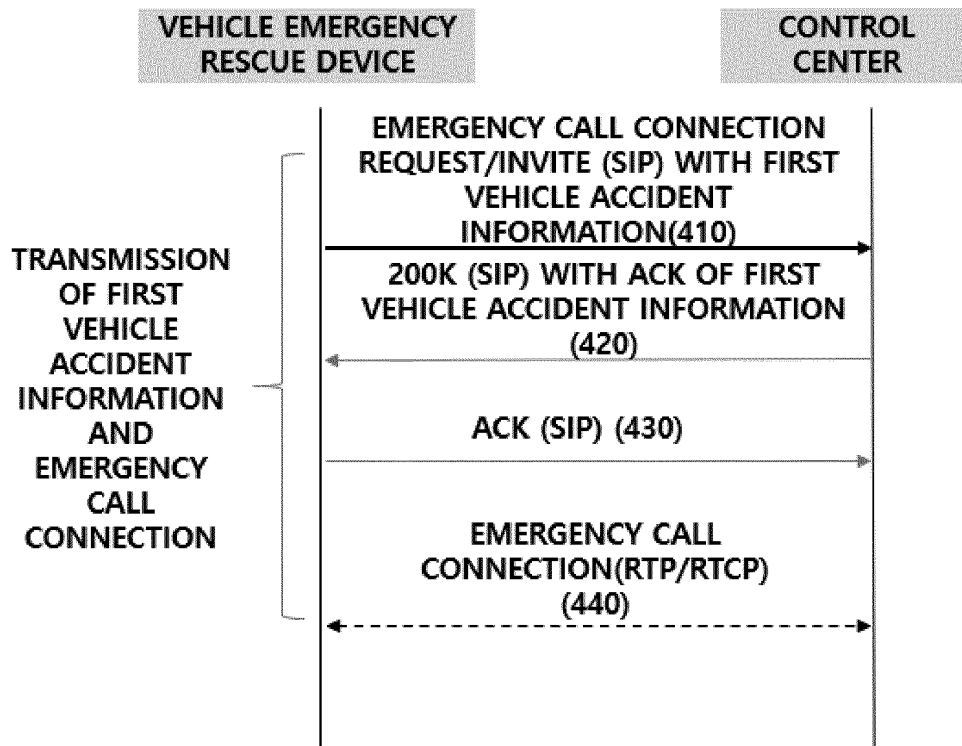
【Fig. 2】

ORDER		EXTENDED INFORMATION	DESCRIPTION	DATA SIZE
1		MSD VERSION	VERSION OF EXTENDED ACCIDENT INFORMATION (SEQUENTIALLY INCREASING FROM 1 TO 256)	1 Byte
2		MSD ORDER	ORDER OF MESSAGES OF EXTENDED ACCIDENT INFORMATION	1 Byte
3		DETERMINED ACCIDENT TIME	DETERMINED ACCIDENT TIME (SECOND-MINUTE-HOUR-DAY-MONTH-YEAR)	4 Byte
4		CONTROL TYPE	TYPE OF CONTROL	1 Byte
5		VEHICLE TYPE	TYPE OF VEHICLE	1 Byte
6		VEHICLE IDENTIFICATION NUMBER	VEHICLE IDENTIFICATION NUMBER	17 Bytes
7		CALLBACK NUMBER	TELEPHONE NUMBER TO CALL BACK	15 Bytes
8		NUMBER OF PASSENGERS	INFORMATION ABOUT THE NUMBER OF PASSENGERS	1 Byte
9		VEHICLE FUEL	INFORMATION ABOUT FUEL OF VEHICLE	1 Byte
10		AIRBAG STATE	INFORMATION ABOUT DEPLOYMENT OR NON-DEPLOYMENT OF AIRBAG	1 Bytes
11		SEATBELT STATE	INFORMATION ABOUT FASTENING OR UNFASTENING OF SEATBELT	1 Byte
12		DOOR OPEN STATE	INFORMATION ABOUT OPEN STATE OF VEHICLE DOOR	1 Byte
13		Reserved	RESERVATION INFORMATION	4 Byte
14		INTERVAL ITERATION DATA VALID COUNT	NUMBER OF PIECES OF INTERVAL ITERATION DATA	1 Byte
INTERVAL ITERATION DATA (30 TIMES/ONE- SECOND INFORMATION)	15	DATA RECORD	DATA RECORD TIME	4 Byte
	16	ACCELERATION (LONGITUDINAL AXIS)	LONGITUDINAL ACCELERATION (MAXIMUM OF ±100.0G) IN VEHICLE TRAVELLING DIRECTION	2 Byte
	17	ACCELERATION (LATERAL AXIS)	LATERAL ACCELERATION (MAXIMUM OF ±100.0G) IN VEHICLE TRAVELLING DIRECTION	2 Byte
	18	VEHICLE LOCATION (LATITUDE)	LATITUDE OF VEHICLE LOCATION	4 Byte
	19	VEHICLE LOCATION (LONGITUDE)	LONGITUDE OF VEHICLE LOCATION	4 Byte
	20	VEHICLE ATTITUDE INFORMATION(Roll, Pitch, Yaw)	VEHICLE ATTITUDE INFORMATION(THREE-AXIS INFORMATION)	6 Byte
	21	VEHICLE AZIMUT	VEHICLE AZIMUTH (BASED ON TRUE NORTH)	2 Byte
	22	VEHICLE SPEED	SPEED OF VEHICLE (km/h)	1 Byte
	23	VEHICLE RPM	RPM OF VEHICLE	2 Byte
	24	BRAKE STATE	ON/OFF STATE OF BRAKE	1 Byte
	25	Reserved	RESERVATION INFORMATION	2 Byte
TOTAL				950 Byte

**【Fig. 3】**



**【Fig. 4】**

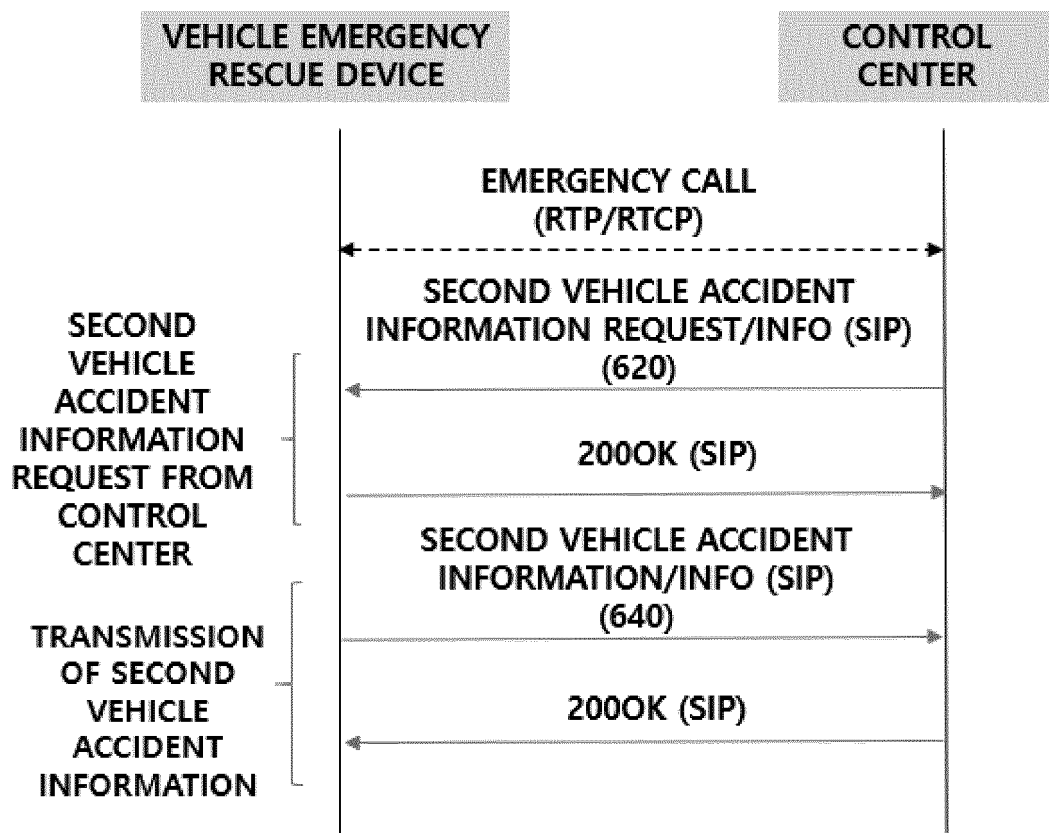


【Fig. 5】





【Fig. 6】



【Fig. 7】

710

```

INFO sip:9000@192.168.2.6:5060;transport=UDP SIP/2.0
From: <um-service:sos.callautomatic>tag=1002a8c0-13d8-5a8b9db-a66c52-5937
To: "9000"<sip:9000@192.168.2.14>tag=71c38760-602a8c0-13c4-539885-112a-5c3809-112a
Call-ID: 71c43380-602a8c0-13c4-539765-112a-402719cb-112a@192.168.2.14
CSeq: 2 INFO
Via: SIP/2.0/UDP 192.168.2.16:5080;branch=z9hG4bK-5a8ba46-a7c098-3662
Max-Forwards: 70
Call-Info: <cid:3456789012@192.168.2.14>; purpose=EmergencyCallData.Control
Info-Package: EmergencyCallData.eCall.xMSD
Allow: INVITE,ACK,BYE,CANCEL,OPTIONS,INFO,SUBSCRIBE,NOTIFY,REFER,UPDATE
Contact: <sip:7777@192.168.2.16:5080>
Route: <sip:192.168.2.14>
Content-Type: multipart/mixed; boundary="Boundary_3959_21b5fa09_71d691b0"
Content-Disposition: Info-Package
Content-Length: 372

```

```

-- Boundary_3959_21b5fa09_71d691b0
Content-Type: application/EmergencyCallData.Control+xml
Content-ID: <3456789012@example.com>
Content-Disposition: by-reference

<?xml version="1.0" encoding="UTF-8"?>
<EmergencyCallData.Control+xml><?xml:lang="en" /><EmergencyCallData.Control>
  <request action="send-data" data-type="eCall.xMSD"/>
</EmergencyCallData.Control>
-- Boundary_3959_21b5fa09_71d691b0--

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730

```

INFO um-service:sos.callautomatic SIP/2.0
From: "9000"<sip:9000@192.168.2.14>tag=71c38760-602a8c0-13c4-539885-112a-5c3809-112a
To: <um-service:sos.callautomatic>tag=1002a8c0-13d8-5a8b9db-a66c52-5937
Call-ID: 71c43380-602a8c0-13c4-539765-112a-402719cb-112a@192.168.2.14
CSeq: 2 INFO
Via: SIP/2.0/UDP 192.168.2.14:5060;port=5060;branch=z9hG4bK-5242871-4c10c352cb05502d
Via: SIP/2.0/UDP 192.168.2.6:5060;branch=z9hG4bK-129f48c0a9-4914c34b
Max-Forwards: 69
Call-Info: <cid:5263333486@192.168.2.14>; purpose=EmergencyCallData.eCall.xMSD
User-Agent: Thallos v1.0.56scm SN001A7EA38446
Info-Package: EmergencyCallData.eCall.xMSD
Contact: <sip:9000@192.168.2.6:5060;transport=UDP>
Allow: INVITE,ACK,BYE,CANCEL,OPTIONS,INFO,SUBSCRIBE,NOTIFY,REFER,UPDATE
Content-Disposition: Info-Package
Content-Type: multipart/mixed; boundary="Boundary129f_48c0aa_52c778_71d8d870"
Content-Length: 1159

```

```

--Boundary129f_48c0aa_52c778_71d8d870
Content-Type: application/EmergencyCallData.eCall.xMSD
Content-ID: <5263333486@192.168.2.14>
Content-Disposition: by-reference

01 01 01 01 04 5a ca 2c e0 01 00 02 00 dd 01 00 01 00 04 5a ca 2c d8 01 00 01 00 04 5a ca 2c d6 01 00 01
00 04 5a ca 2c e0 01 00 02 00 cd 01 5a 11 c3 8b 1c 4c b8 71 63 c9 95 8b 26 8c 18 30 60 1c c1 8b 06 2c 99
b4 62 c9 9b 46 0c 18 30

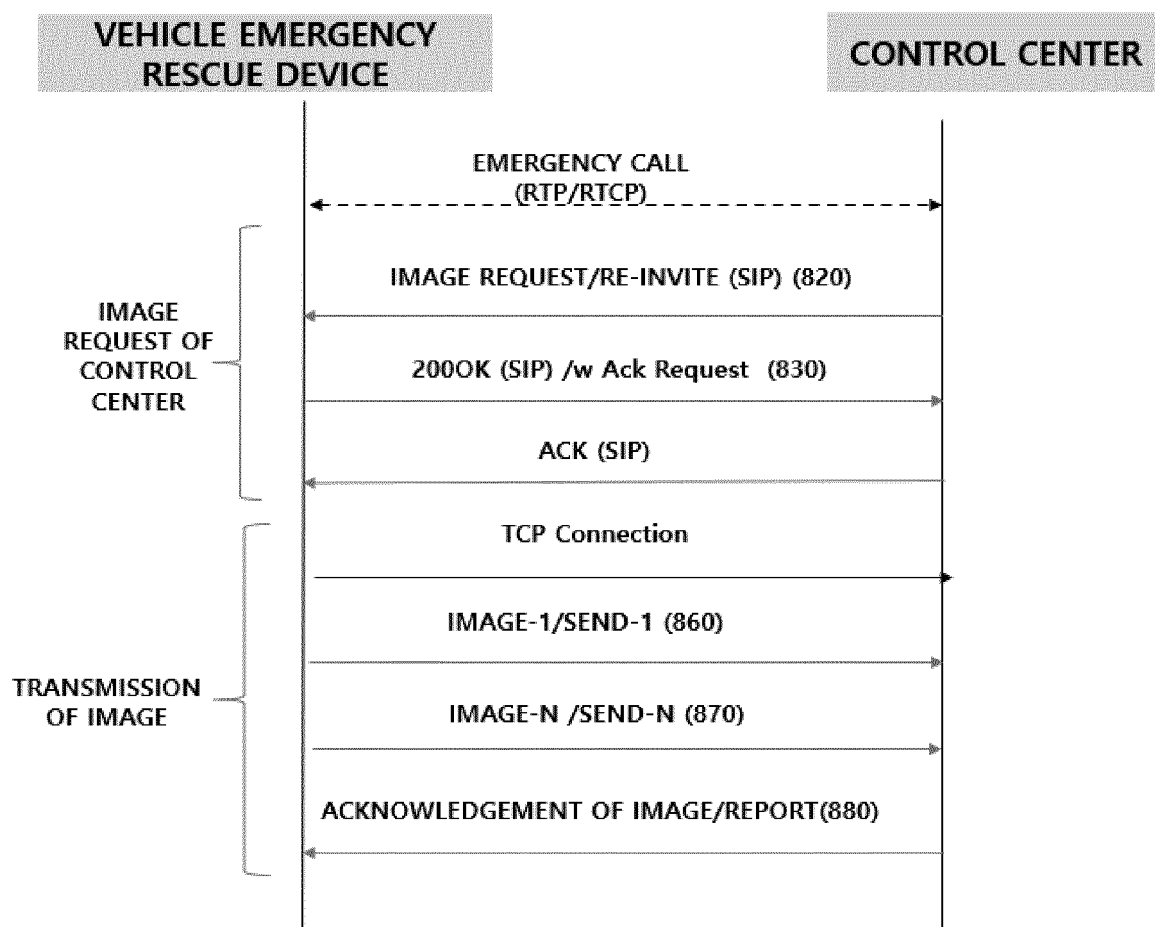
01 01 01 01 04 5a ca 2c e0 01 00 02 00 dd 01 00 01 00 04 5a ca 2c d8 01 00 01 00 04 5a ca 2c d6 01 00 01
00 04 5a ca 2c e0 01 00 02 00 cd 01 5a 11 c3 8b 1c 4c b8 71 63 c9 95 8b 26 8c 18 30 60 1c c1 8b 06 2c 99
b4 62 c9 9b 46 0c 18 30

--Boundary129f_48c0aa_52c778_71d8d870--

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720

【Fig. 8】

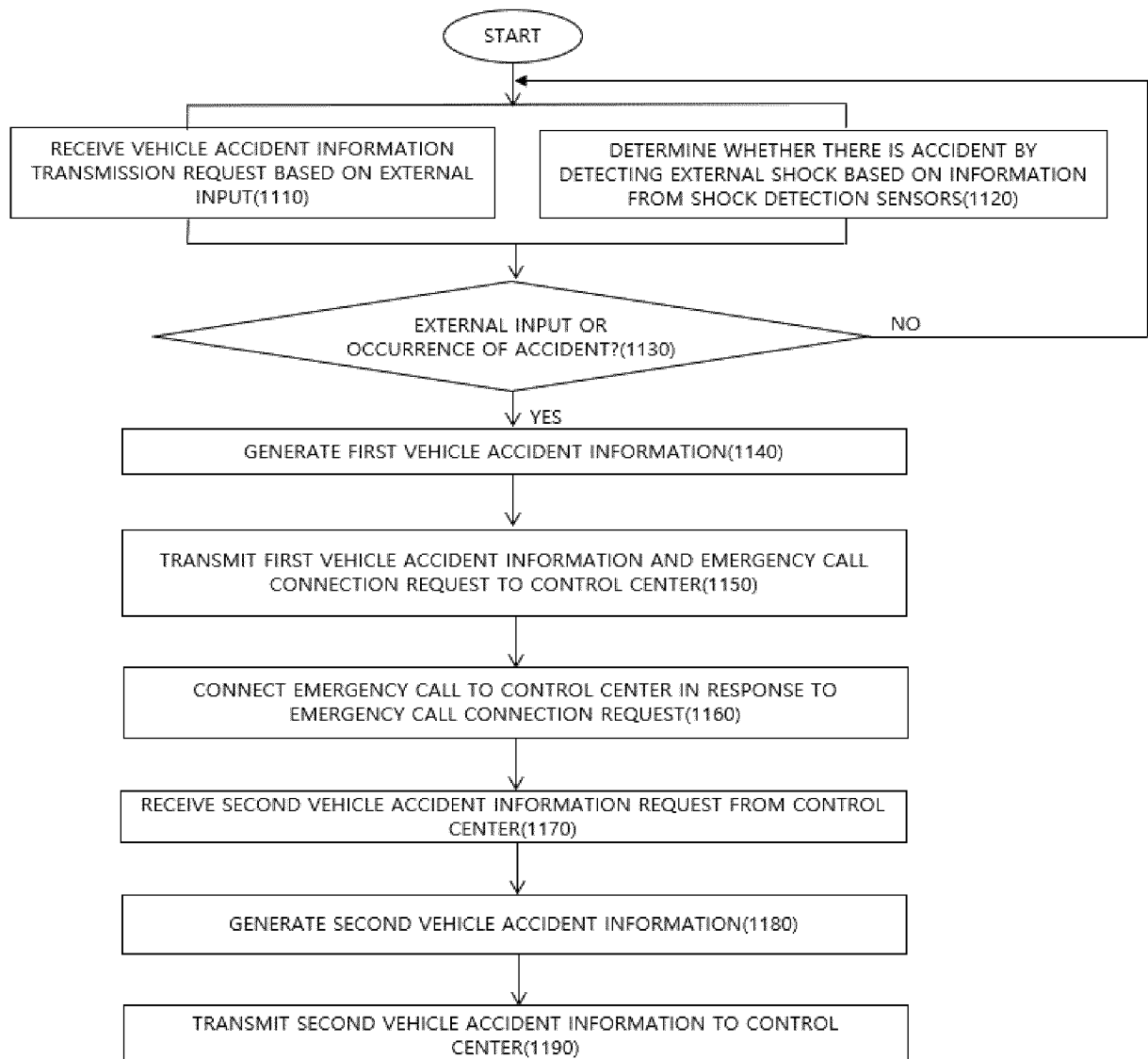


【Fig. 9】

910	920
<pre> INVITE sip:9000@192.168.2.6:5060;transport=UDP SIP/2.0 From: &lt;um-service:sss.conf:auto@1002a8c0-13d8-5afbf9db-a66e92-5957&gt; To: "0000"&lt;sip:9000@192.168.2.14&gt;;tag=71c38760-602a8c0-13c4-539885-112a-5c38d09-112a Call-ID: 71c43380-602a8c0-13c4-539765-112a-4027191d-112a@192.168.2.14 CSeq: 3 INVITE Via: SIP/2.0/UDP 192.168.2.16:5080;branch=6bG4bK-5afbf9db394b354b1-56ae Max-Forwards: 70 Contact: &lt;sip:7777@192.168.2.16:5080&gt; Route: &lt;sip:192.168.2.14&gt; Content-Type: application/SDP Content-Length: 693  v=0 o=ev-test-app 17521 17521 IN IP4 192.168.2.16 s=SIP Call c=IN IP4 192.168.2.16 t=0 0 m=audio 5004 RTP/AVP 0 101 b=AS:82 a=frtp:18 annex=ms a=frtp:101 0-15 a=ptime:20 a=rtpmap:0 PCMU/8000 a=rtpmap:101 telephone-event/8000 a=sendrecv  m=message 7000 TCP/MSRP * a=accept-type: image/jpeg,frsct=4 a=max-size:900000 a=path:msrp://192.168.2.8:7000/9999ae923wzldap a=file-select:citypc:imgc/jpeg a=file-transfer-id:Q613doGymldh0IKjD6wD0jkcgv4vE a=recvonly </pre>	<pre> SIP/2.0 200 OK From: &lt;um-service:sss.conf:auto@1002a8c0-13d8-5afbf9db-a66e92-5957&gt; To: "0000"&lt;sip:9000@192.168.2.14&gt;;tag=71c38760-602a8c0-13c4-539885-112a-5c38d09-112a Call-ID: 71c43380-602a8c0-13c4-539765-112a-4027191d-112a@192.168.2.14 CSeq: 3 INVITE Via: SIP/2.0/UDP 192.168.2.16:5080;branch=6bG4bK-5afbf9db394b354b1-56ae Contact: &lt;sip:9000@192.168.2.6:5060;transport=UDP&gt; Allow: INVITE,ACK,BYE,CANCEL,OPTIONS,INFO,SUBSCRIBE,NOTIFY,REFER,UPDATE User-Agent: Thallos v1.0.56scm SMI001A7EA38446 Content-Type: application/SDP Content-Length: 485  v=0 o=THL_KOT_DEVKCF 15365 15366 IN IP4 192.168.2.6 s=MGICCall c=IN IP4 192.168.2.6 t=0 0 m=audio 50006 RTP/AVP 0 101 c=IN IP4 192.168.2.6 b=AS:82 a=rtpmap:0 PCMU/8000 a=rtpmap:101 telephone-event/8000 a=frtp:101 0-15 a=ptime:20 a=sendrecv  m=message 6666 TCP/MSRP * a=accept-type: image/jpeg,frsct=4 a=path:msrp://192.168.2.6:6666/180d61670bldap a=file-select:citypc:imgc/jpeg a=file-transfer-id:Q613doGymldh0IKjD6wD0jkcgv4vE a=recvonly </pre>



【Fig. 11】



## INTERNATIONAL SEARCH REPORT

International application No.

PCT/KR2019/000939

## A. CLASSIFICATION OF SUBJECT MATTER

G08B 21/18(2006.01)i, G08B 21/10(2006.01)i, G08B 21/04(2006.01)i, G08B 25/00(2006.01)i, G08B 27/00(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)

G08B 21/18; B60R 21/01; G06Q 50/30; G08B 21/00; G08B 25/10; G08B 27/00; H04L 29/06; H04M 3/51; H04W 4/00; H04W 4/22; G08B 21/10; G08B 21/04; G08B 25/00

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: IPC as above

Japanese utility models and applications for utility models: IPC as above

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

eKOMPASS (KIPO internal) &amp; Keywords: automotive emergency rescue, accident information, input, accident determination part, external shock detection, vehicle accident, accident information generation part, transfer part, emergency call voice calling part

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	KR 10-2016-0000276 A (HYUNDAI MOBIS CO., LTD.) 04 January 2016 See paragraphs [0007], [0026]-[0060], claim 5 and figures 1-8.	1-3, 10-12, 19
Y		4-9, 13-18
Y	KR 10-2017-0000778 A (NRP SYSTEM. CO., LTD.) 03 January 2017 See paragraphs [0015]-[0043], claim 6 and figures 1-2.	4, 6-8, 13, 15-17
Y	KR 10-2017-0100422 A (ELECTRONICS AND TELECOMMUNICATIONS RESEARCH INSTITUTE) 04 September 2017 See paragraphs [0036], [0054], [0086]-[0087], [0118]-[0121], claims 9-17 and figures 1-2.	5, 14
Y	KR 10-2011-0117225 A (APPLE INC.) 26 October 2011 See abstract, paragraphs [0067], [0077], claims 1-2, 11-12 and figures 2, 4-5.	8-9, 17-18
A	KR 10-2018-0012208 A (ELECTRONICS AND TELECOMMUNICATIONS RESEARCH INSTITUTE) 05 February 2018 See paragraphs [0017]-[0122] and figures 1-3.	1-19

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

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Date of the actual completion of the international search

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INTERNATIONAL SEARCH REPORT  
Information on patent family members

International application No.

PCT/KR2019/000939

Patent document cited in search report	Publication date	Patent family member	Publication date
KR 10-2016-0000276 A	04/01/2016	None	
KR 10-2017-0000778 A	03/01/2017	KR 10-1738414 B1 WO 2016-208914 A1	22/05/2017 29/12/2016
KR 10-2017-0100422 A	04/09/2017	US 10212571 B2 US 2017-0251346 A1	19/02/2019 31/08/2017
KR 10-2011-0117225 A	26/10/2011	AU 2010-213911 A1 AU 2010-213911 B2 AU 2010-213911 C1 AU 2014-204558 A1 AU 2014-204558 B2 BR P11008545 A2 CA 2752582 A1 CA 2752582 C CN 102362476 A CN 102362476 B CN 104580218 A CN 104580218 B EP 2396947 A1 EP 3076691 A1 JP 2012-517771 A JP 2015-173482 A JP 6086466 B2 JP 6086508 B2 RU 2011137008 A RU 2504111 C2 US 2010-0202368 A1 US 2013-0003611 A1 US 2015-0029836 A1 US 8265022 B2 US 9220002 B2 US 9900758 B2 WO 2010-093646 A1	08/09/2011 24/04/2014 21/07/2016 07/08/2014 24/12/2015 15/03/2016 19/08/2010 18/10/2016 22/02/2012 10/12/2014 29/04/2015 20/07/2018 21/12/2011 05/10/2016 02/08/2012 01/10/2015 01/03/2017 01/03/2017 20/03/2013 10/01/2014 12/08/2010 03/01/2013 29/01/2015 11/09/2012 22/12/2015 20/02/2018 19/08/2010
KR 10-2018-0012208 A	05/02/2018	None	