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(54) METHOD AND APPARATUS FOR CONTENT PROTECTION IN WI-FI DIRECT NETWORK

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(57) **ABSTRACT**

A method of performing communication between a first device and a second device by using a Wi-Fi direct scheme is provided. The method may include receiving, by the first device, information on relating to a content protection capability of the second device in during a device discovery procedure; and determining, by the first device, whether to perform a connection setup procedure with the second device based on the received information on relating to the content protection capability of the second device.

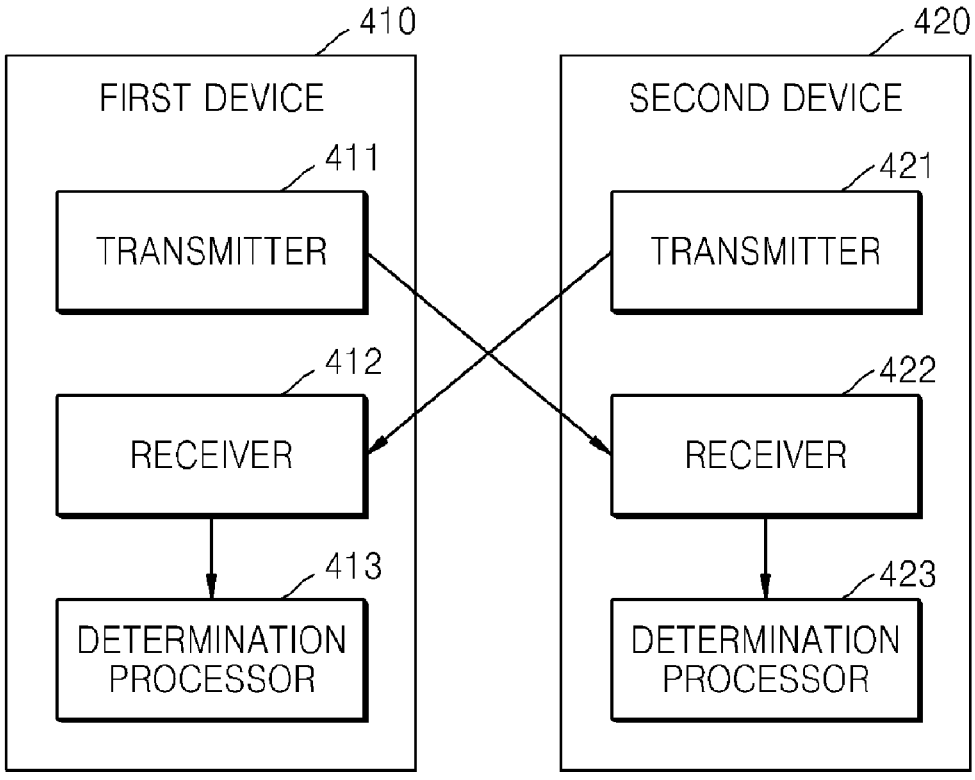


FIG. 1

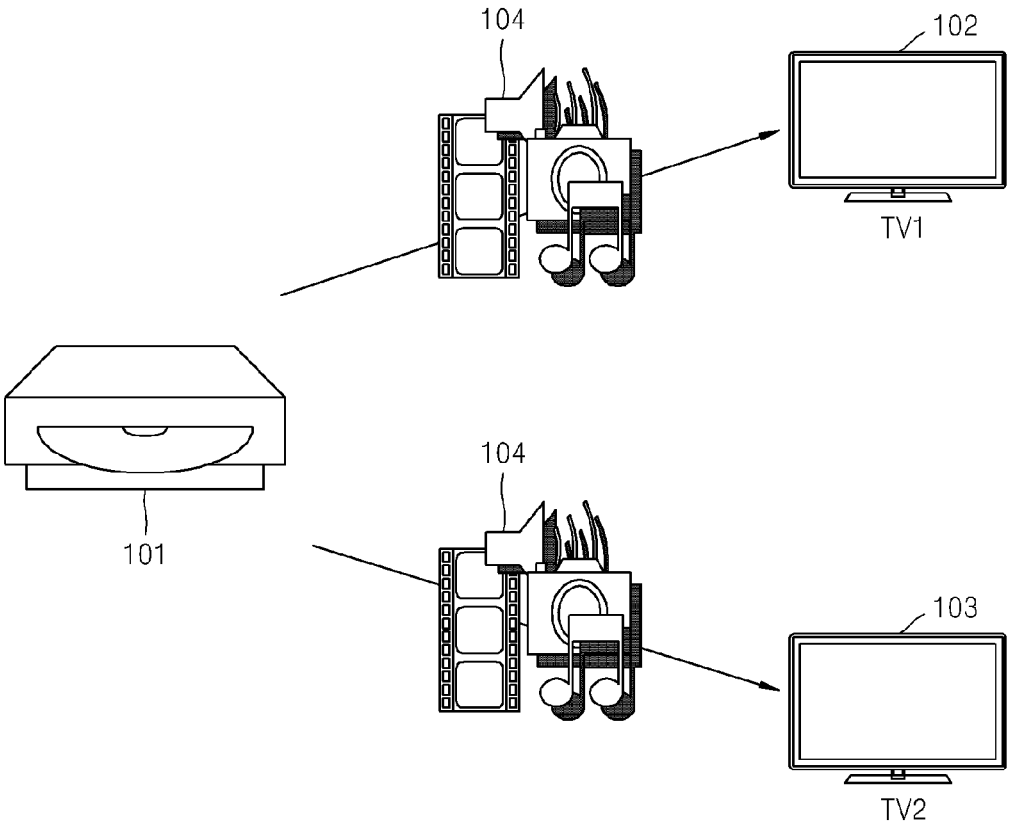


FIG. 2

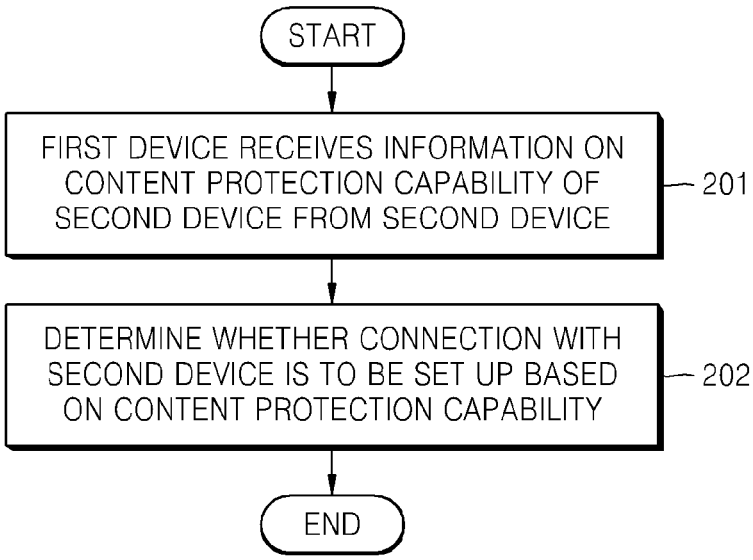

START
FIRST DEVICE RECEIVES INFORMATION ON CONTENT PROTECTION CAPABILITY OF SECOND DEVICE FROM SECOND DEVICE
201
DETERMINE WHETHER CONNECTION WITH SECOND DEVICE IS TO BE SET UP BASED ON CONTENT PROTECTION CAPABILITY
202
END

FIG. 3

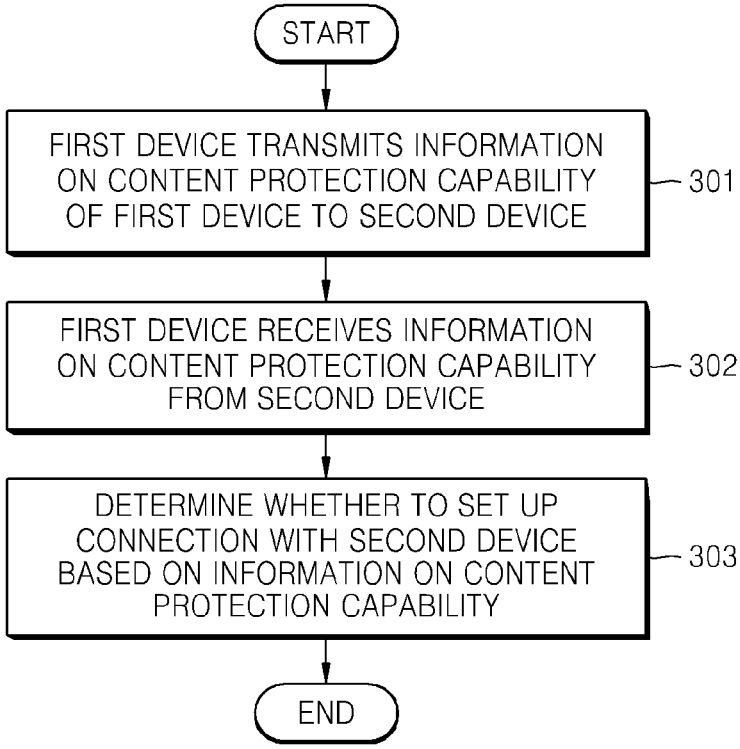

START
FIRST DEVICE TRANSMITS INFORMATION ON CONTENT PROTECTION CAPABILITY OF FIRST DEVICE TO SECOND DEVICE
301
FIRST DEVICE RECEIVES INFORMATION ON CONTENT PROTECTION CAPABILITY FROM SECOND DEVICE
302
DETERMINE WHETHER TO SET UP CONNECTION WITH SECOND DEVICE BASED ON INFORMATION ON CONTENT PROTECTION CAPABILITY
303
END

FIG. 4

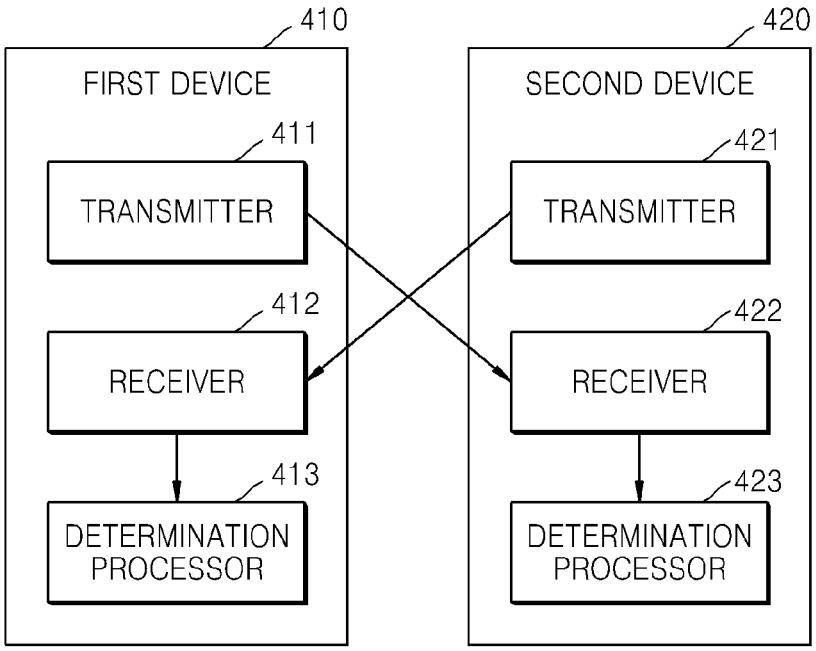


FIG. 5

Field	Size (octets)	Value (Hexadecimal)
Element ID	1	DD
Length	1	Variable
OUI	3	00 50 F2
OUI Type	1	
WFD Subelements	Variable	

FIG. 6

Field	Size (octets)	Value (Hexadecimal)
Subelements ID	1	Variable
Length	1	Variable
Subelements body field	Variable	

FIG. 7

Subelements ID	Notes
0	Status
1	WFD Device Information
2	Associated BSSID
3	Coupled Sink Information
4	Display EDID
5	H.264 codec
6	LPCM Codec
7	AAC Codec
8	Dolby Digital Codec
9	DTS Codec
10	Transport Capability
11	3D Video Capability
12	Local IP Address
13	Control Signaling Capabilities
14-255	Reserved

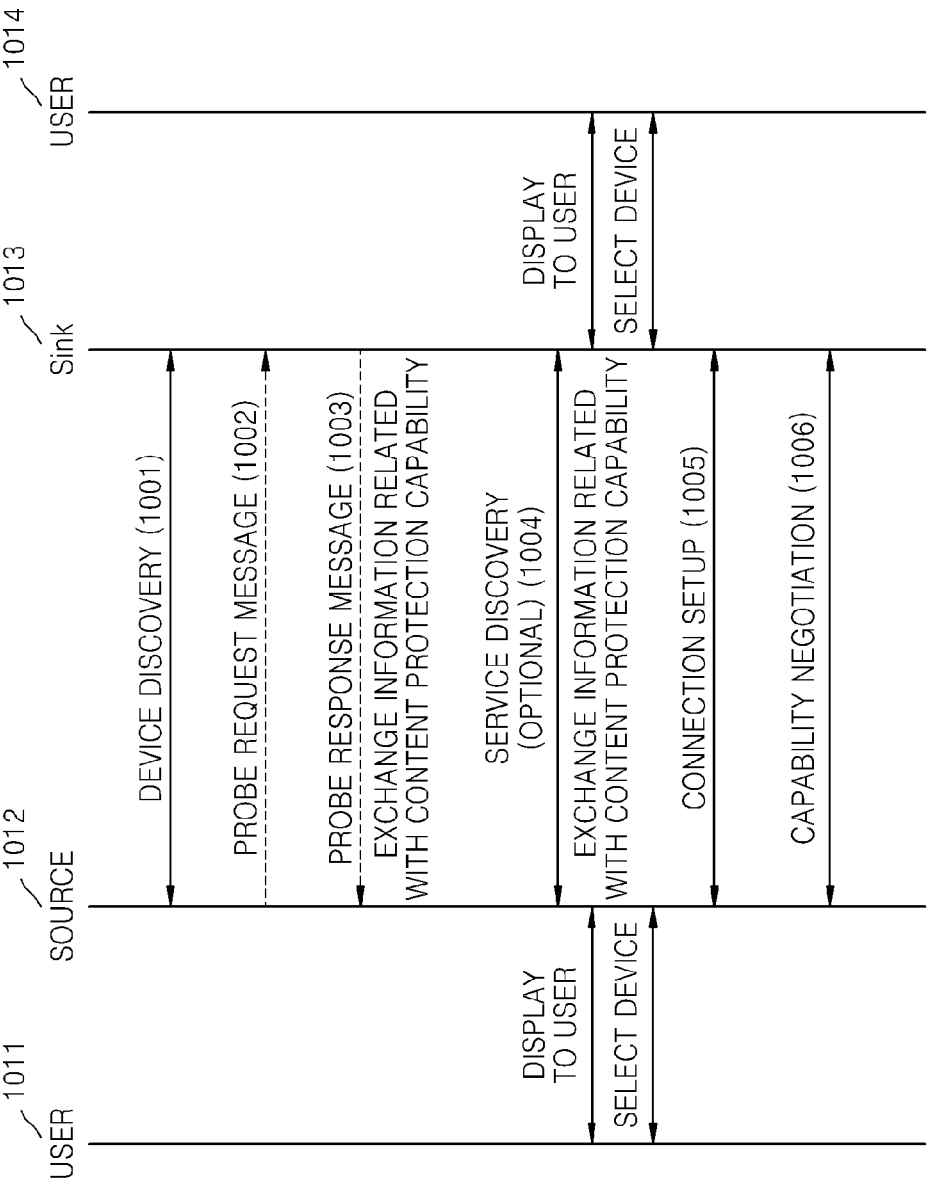
FIG. 8

Field	Size (octets)	Value
Subelements ID	1	1
Length	1	3
WFD Device Information	1	
WFD Device Maximum Throughput	2	

FIG. 9

Bits	Interpretation
0~1	0b00: WFD source 0b01: WFD primary sink 0b10: WFD secondary sink 0b11: WFD source/primary sink
2	0b0: secondary sink operation not supported 0b1: secondary sink operation supported
3~4	0b00: Not-paired/Available for pairing 0b01: Paired & Idle 0b10: Active 0b11: Set by WFD source devices; Set by WFD sink devices not supporting secondary sink operation.
5	0b0: WFD Service Discovery (WSD): Not supported 0b1: WFD Service Discovery (WSD): supported
6	0b0: Preferred Connectivity (PC): P2P 0b1: Preferred Connectivity (PC): TDLS
7	Content Protection
8~15	Reserved

FIG. 10


1011
USER
1012
SOURCE
1013
Sink
1014
USER
DEVICE DISCOVERY (1001)
PROBE REQUEST MESSAGE (1002)
PROBE RESPONSE MESSAGE (1003)
EXCHANGE INFORMATION RELATED WITH CONTENT PROTECTION CAPABILITY
SERVICE DISCOVERY (OPTIONAL) (1004)
EXCHANGE INFORMATION RELATED WITH CONTENT PROTECTION CAPABILITY
CONNECTION SETUP (1005)
CAPABILITY NEGOTIATION (1006)
DISPLAY TO USER
SELECT DEVICE
DISPLAY TO USER
SELECT DEVICE

METHOD AND APPARATUS FOR CONTENT PROTECTION IN WI-FI DIRECT NETWORK

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application is a National Stage of International Application No. PCT/KR2011/010067 filed Dec. 23, 2011, and claims priority from U.S. Provisional Application No. 61/427,156 filed Dec. 24, 2010, the disclosure of which is incorporated herein in its entirety by reference.

BACKGROUND

[0002] 1. Field

[0003] Apparatuses and methods in accordance with exemplary embodiments relate to a method and device for protecting content in a Wi-Fi direct communication scheme.

[0004] 2. Description of the Related Art

[0005] A Wi-Fi direct communication scheme uses a network arrangement of participating devices where connection is by a peer-to peer scheme between the devices. When using the Wi-Fi direct communication scheme, the Wi-Fi devices do not necessitate connection to, the use of, or participation in a home network, an office network, or a hot spot network. That is, a Wi-Fi direct communication scheme provides direct connection between two devices without the need for any form of an additional individual router, hub, gate, etc. outside the two connecting devices in order to facilitate transmissions.

[0006] FIG. **1** illustrates a related art Wi-Fi direct communication scheme.

[0007] In FIG. **1**, a digital versatile disk (DVD) player **101** uses the Wi-Fi direct communication scheme to transmit content **104** such as music, photos, and moving images to a display devices, for example, to a television (TV) TV1 **102** or a TV2 **103** which is a display device.

[0008] The DVD player **101** may be another device that stores a content, such as Blue-ray player, an MP3 player, a personal computer, personal digital assistant, a mobile device, and a simple storage medium.

[0009] The TV1 **102** or the TV2 **103** may be another device that displays content to a user, such as a monitor and a speaker.

[0010] The content **104** may be an original work of authorship such as music, a photo, and a moving image that may be content protected by a copyright.

[0011] The Wi-Fi direct (P2P) scheme is not a standard that has been suggested in consideration of a display device. Rather the Wi-Fi direct scheme is a standard that has been suggested on the basis of connectivity between devices. Accordingly, the Wi-Fi direct scheme does not recognize whether a device supports content protection before setting connection between devices.

[0012] For example, in the Wi-Fi direct scheme, it is not possible for the DVD player **101** to recognize whether each TV supports content protection before setting up a connection with the TV1 **102** and the TV2 **103** as depicted in FIG. **1**. According to one exemplary embodiment, TV1 **102** may be a device that does not supports content protection, while TV2 **103** may be a device that does supports content protection. In such an embodiment, if the DVD player **101** connects to the TV1 **102** through the Wi-Fi direct scheme and sends the content **104** protected by the copyright to TV1 **102** with the instructions for the content to be displayed, a message indicating that the content cannot be replayed on TV1 **102** will instead be displayed due to the lack of support for the specific content protection. Thus, when the user desires to replay the content **104** through the DVD player **101**, the user may be inconvenienced due to the lost time and energy exerted in the attempt to connect and display the content on TV1 and then the additional wait for the connection between the DVD player **101** and the TV2 **103** to occur and then replay the content.

[0013] It is also worth noting that even though the TV1 **102** does not support content protection and thus cannot replay the content **104**, power and time is still consumed when connecting with the DVD player **101**.

SUMMARY

[0014] One or more exemplary embodiments provide a method for receiving information relating to whether a device supports content protection during a device discovery procedure of searching for a surrounding device when performing communication between display devices according to a Wi-Fi direct scheme in order to provide a communication scheme for performing an efficient Wi-Fi direct communication scheme between display devices.

[0015] According to an aspect of an exemplary embodiment, there is provided a method of performing communication between a first device and a second device by using a Wi-Fi direct scheme, the method including: receiving information relating to a content protection capability of the second device during a device discovery procedure; and determining whether to perform a connection setup procedure with the second device based on the received information relating to the content protection capability.

[0016] The receiving of the information relating to the content protection capability of the second device may include receiving a probe response message including the information relating to the content protection capability.

[0017] The method may further include: transmitting information relating to a content protection capability of the first device to the second device, wherein the information the content protection capability of the second device is received in response to the transmitted information relating to the content protection capability of the first device.

[0018] The transmitting of the information relating to the content protection capability of the first device may include transmitting a probe request message including the information relating to the content protection capability.

[0019] The information relating to the content protection capability may be included in a Wi-Fi Display Information Element (WFD IE).

[0020] The information relating to the content protection capability may be included in a Wi-Fi Display (WFD) Device Information Field within the WFD IE.

[0021] The information relating to the content protection capability may indicate whether a high-definition content protection 2.0 (HDCP 2.0) is supported.

[0022] According to an aspect of another exemplary embodiment, there is provided a device for performing communication using a Wi-Fi direct scheme, including: a receiver configured to receive information relating to a content protection capability of a second device in a device discovery procedure; and a determination processor configured to determine whether to perform a connection setup procedure with

the second device based on the received information relating to the content protection capability.

[0023] The receiver may be configured to receive a probe response message including the information relating to the content protection capability.

[0024] The device may further include: a transmitter configured to transmit information relating to a content protection capability of the device to the second device, wherein the information relating to the content protection capability of the second device is received in response to the transmitted information relating to the content protection capability of the device.

[0025] The transmitter may transmit a probe request message including the information relating to the content protection capability.

[0026] The information relating to the content protection capability may be included in a Wi-Fi Display Information Element (WFD IE).

[0027] The information relating to the content protection capability may be included in a Wi-Fi Display (WFD) Device Information Field within the WFD IE.

[0028] The information relating to the content protection capability may indicate whether a high-definition content protection 2.0 (HDCP 2.0) is supported.

BRIEF DESCRIPTION OF THE DRAWINGS

[0029] The above and other aspects will become more apparent by describing in detail exemplary embodiments with reference to the attached drawings in which:

[0030] FIG. **1** is a diagram illustrating a related art Wi-Fi direct communication scheme;

[0031] FIG. **2** is a flowchart illustrating a device discovery procedure of a first device according to an exemplary embodiment;

[0032] FIG. **3** is a flowchart illustrating a device discovery procedure of a first device according to another exemplary embodiment;

[0033] FIG. **4** is a block diagram illustrating a structure of a first device and a second device according to an exemplary embodiment;

[0034] FIG. **5** is a table illustrating a Wi-Fi display (WFD) information element (IE) according to an exemplary embodiment;

[0035] FIG. **6** is a table illustrating a general format of a WFD subelement according to an exemplary embodiment;

[0036] FIG. **7** is a table illustrating a WFD subelement ID according to an exemplary embodiment;

[0037] FIG. **8** is a table illustrating a WFD device information subelement according to an exemplary embodiment;

[0038] FIG. **9** is a table illustrating a WFD device information field according to an exemplary embodiment; and

[0039] FIG. **10** is a signal flowchart of a WFD communication according to an exemplary embodiment.

DETAILED DESCRIPTION

[0040] One or more exemplary embodiments will now be described more fully with reference to the accompanying drawings, in which exemplary embodiments are shown. Like reference numerals in the drawings denote like elements, and thus their description will be omitted. The size of each component of drawings may be exaggerated for clarity of description.

[0041] FIG. **2** is a flowchart illustrating a device discovery procedure of a first device according to an exemplary embodiment.

[0042] The device discovery procedure is a procedure for not only finding a surrounding device for communication, but is also a procedure that includes searching for a device that supports a Wi-Fi direct scheme among devices existing around another device in order for the two devices to connect. Further, when there is a device that supports a Wi-Fi direct scheme, information on each device may be received.

[0043] However, the related art Wi-Fi direct (P2P) scheme is not a standard that has been suggested for consideration with use of a display device, because of the lack of any procedure for appropriately protecting content in the device discovery procedure.

[0044] Thus, in accordance with an exemplary embodiment, in operation **201**, a first device receives information regarding the content protection capability of a second device from the second device during the device discovery procedure.

[0045] The information relating to the content protection capability is information about whether the device supports content protection.

[0046] The information relating to the content protection capability of the second device received from the second device may be included in a probe response message. The probe response message is a message containing receiving device information as required by the device discovery procedure of the Wi-Fi direct communication scheme.

[0047] Further, in accordance with an exemplary embodiment, the information relating to the content protection capability may be included in the Wi-Fi display information element (WFD IE). The WFD IE will be described later in detail with reference to FIG. **5**.

[0048] Furthermore, the information relating to the content protection capability may be included in the WFD information field within the WFD IE. The WFD information field will be described later in detail with reference to FIG. **8**.

[0049] According to an exemplary embodiment, the information relating to the content protection capability may be information indicating whether the second device supports high definition content protection 2.0 (High-bandwidth Digital Content Protection HDCP 2.0).

[0050] The HDCP is a copyright protection technology for encrypting a path through which digital signals are transmitted and received from a moving image replay device to a display device. HDCP prevents any unauthorized copying of content, and accordingly is a standard designed to protect the integrity of digital content.

[0051] In operation **202**, it is determined whether the first device may perform a connection setup procedure with the second device based on information relating to the content protection capability of the second device received in operation **201**.

[0052] That is, the first device determines whether the second device supports content protection by the information received from the second device, and determines whether to perform a connection setup procedure with the second device.

[0053] Various methods may be used to determine whether to perform the connection setup procedure. For example, when there are a plurality of devices that support a Wi-Fi direct communication scheme, information on whether to perform a connection setup with another device may be determined by and received from the user after the user is provided

compatible devices that may be done by displaying the plurality of devices that support content protection on the first device.

[0054] According to another exemplary embodiment, a connection setup may be set to be automatically performed according to a priority that is set in the first device.

[0055] Further, if there is only one device that supports the Wi-Fi direct communication scheme, the device may be set to display whether the device supports content protection before performing the connection setup.

[0056] FIG. **3** is a flowchart illustrating a device discovery procedure of a first device according to another exemplary embodiment.

[0057] In the Wi-Fi direct scheme, the device that is determined to be the device that operates as an access point (AP), or the device that operates as a station, may be determined after the connection setup procedure. Thus, the role of each device may not be determined during the device discover procedure. Accordingly, the second device may need the information of the first device after the connection setup procedure, and therefore the second device receives the information of the first device.

[0058] In operation **301**, the first device transmits information relating to the content protection capability of the first device to the second device.

[0059] The information relating to the content protection capability transmitted by the first device to the second device may be included in a probe request message.

[0060] The probe request message is a message containing transmitting device information in the device discovery procedure of the Wi-Fi direct communication scheme.

[0061] The information relating to the content protection capability may be included in WFD IE.

[0062] The information relating to the content protection capability may be included in the WFD device information field within the WFD IE.

[0063] The information relating to the content protection capability may be information indicating whether HDCP 2.0 is supported.

[0064] In operation **302**, the first device receives information relating to the content protection capability from the second device.

[0065] In operation **303**, the first device determines whether to set up connection with the second device based on the information relating to the content protection capability of the second device. The connection setup may be performed in various schemes as was described with reference to FIG. **2**.

[0066] Further, the second device may also determine whether to set up connection with the first device based on the information relating to the content protection capability received from the first device. The connection set up may be determined based on a combination of both the first and second devices' information on their content protection capability.

[0067] FIG. **4** is a block diagram illustrating a structure of a first device and a second device according to an exemplary embodiment.

[0068] The transmitter **411** of the first device **410** transmits information relating to the content protection capability of the first device to the second device. As illustrated in FIG. **3**, the information related to the content protection capability of the first device **410** may be included in the probe request message, WFD IE, and more specifically, it may be included in the WFD device information field of the WFD IE.

[0069] A receiver **412** of the first device **410** receives information related with the content protection capability of the second device **420** from the second device.

[0070] The determination processor **413** of the first device **410** determines whether to perform a connection setup procedure with the second device **420** based on the information related with the content protection capability of the second device which has been received by the receiver of the first device **410** from the transmitter **421** of the second device **420**.

[0071] The transmitter of the second device **420** transmits the information related with the content protection capability of the second device **420** to the first device **410**.

[0072] The receiver **422** of the second device **420** receives information related with the content protection capability of the first device **410** from the transmitter **411** of the first device **410**.

[0073] A determination processor **423** of the second device determines whether to perform a connection setup procedure with the first device **410** based on information related with the content protection capability of the first device **410** received from the transmitter **411** of the first device **410**.

[0074] FIG. **5** is a table illustrating a Wi-Fi display (WFD) information element (IE) according to an exemplary embodiment.

[0075] Here, WFD is a communication scheme, and refers to a scheme where communication is performed between display devices based on Wi-Fi direct standard.

[0076] WFD IE represents a format of a frame that receives basic information such as a device type and state. The probe request frame or probe response frame is also written according to the format of the WFD IE.

[0077] In the illustrated example, WFD IE includes Element ID, Length, OUI, OUI Type, and WFD Subelements. Respective sizes of Element ID, Length, OUI, and OUI TYPE fields are 1, 1, 3 and 1 octets, where an octet consists of eight bits, and the size of WFD Subelements is a variable number of bits.

[0078] Element ID field is a field that is used when a vendor desires to make functions that are not defined in IEEE 802.11 standard, and Length field denotes the entire length of WFD IE. For example, as discussed below, FIG. **7** illustrates of different identifiers this field could be set to in order to reference the noted element which may be outside the defined IEEE 802.11 standard.

[0079] OUI field is an abbreviation of Organization Unique Identifier and represents a unique identifier defined to distinguish each vendor, and OUI Type field represents the version of WFD IE.

[0080] The content written in the WFD IE may not be sufficient for the WFD

[0081] Subelement field, and thus the points indicating detailed device information are included in the WFD Subelement field. The points included in the WFD Subelement field will be described in detail with reference to FIG. **6**.

[0082] Some of the WFD IE fields of one or more exemplary embodiments may be omitted.

[0083] FIG. **6** is a table illustrating a general format of a WFD Subelement according to an exemplary embodiment.

[0084] Here, in FIG. **6**, the WFD Subelement includes Subelement ID, Length, and Subelements body fields. Sizes of Subelement ID and Length fields are respectively 1 octet, and the size of the Subelement body field is variable.

[0085] The Subelement ID of an exemplary embodiment represents a type of the WFD Subelement, which will be described later in detail with reference to FIG. **7**.

[0086] The Length field of an exemplary embodiment represents the entire length of the WFD Subelement.

[0087] The Subelements body field of an exemplary embodiment shows specific points of the Subelement.

[0088] Some of the WFD Subelements may be omitted.

[0089] FIG. **7** is a table illustrating a WFD subelement ID according to an exemplary embodiment.

[0090] The WFD subelement ID may be set to identify the variable length body as WFD Device Information of an exemplary embodiment which refers to information on WFD device. In one or more exemplary embodiments, the content protection capability of a device intended to be acquired before setting up connection is written on the WFD Subelement of the WFD Device Information type, which will be described in detail with reference to FIG. **8**.

[0091] Status of an exemplary embodiment represents status information of the device.

[0092] Associated BSSID of an exemplary embodiment represents an identifier that identifies a basic service area in 802.11.

[0093] Display EDID of an exemplary embodiment represents a type of data for transmitting display information of a device.

[0094] Coupled Sink Information of an exemplary embodiment represents connection with another device.

[0095] H.264 Codec, LPCM Codec, AAC Codec, Dolby Digital Codec, and DTS Codec of an exemplary embodiment show information related to Codec. Each Codec is a well-known standard in the art and thus detailed description on each Codec is omitted here.

[0096] Transport Capability, 3D Video Capability, Local IP Address, and Control Signaling Capabilities of an exemplary embodiment show the capability and address of the device, and the detailed description thereof is omitted here.

[0097] Furthermore, the information related with content protection capability may be included in the Subelement ID by adding Content Protection Capability.

[0098] Some of Subelement IDs may be omitted.

[0099] FIG. **8** is a table illustrating information that may be included in a WFD device information Subelement according to an exemplary embodiment.

[0100] In accordance with one or more exemplary embodiments, when the Subelement ID field is one (1) as noted in FIG. **7**, the Subelement about WFD Device Information is included. Here, the content related with device information is displayed in WFD device information in a bitmap format. The details are described with reference to FIG. **8**.

[0101] WFD Device Maximum Throughput shows the maximum average throughput of the device.

[0102] FIG. **9** is a table illustrating different possible values that could be found in a WFD device information field according to an exemplary embodiment.

[0103] WFD device information field may be disclosed in a bitmap form.

[0104] First and second bits of WFD device information field (bits **0** and **1**) of an exemplary embodiment indicate a WFD source, a WFD sink, a primary sink device or a secondary sink device.

[0105] A third bit of WFD device information field (bit **2**) of an exemplary embodiment indicates whether a secondary sink operation is supported.

[0106] Fourth and fifth bits of WFD device information field (bits **3** and **4**) of an exemplary embodiment indicate a paring state of the current device and whether paring is possible.

[0107] A sixth bit of WFD device information field (bit **5**) of an exemplary embodiment indicates whether a WFD service discovery procedure is supported.

[0108] A seventh bit of WFD device information field (bit **6**) of an exemplary embodiment indicates a connection scheme of the device. That is, the seventh bit indicates whether the device supports a Wi-Fi direct scheme, i.e., P2P scheme, or a tunneled direct link setup (TDLS) scheme. The TDLS scheme is not the Wi-Fi direct scheme, and is a scheme of wireless communication where communication is performed through an AP.

[0109] An eighth bit of WFD device information field (bit **7**) of an exemplary embodiment indicates information on content protection capability of the device. As illustrated in FIG. **7**, the content protection capability may be defined in the Subelement ID and the points that display the content protection capability may be added, and as illustrated in FIG. **9**, information related to the content protection capability of the device may be indicated within the device information Subelement.

[0110] The content protection capability of an exemplary embodiment may be information indicating whether HDCP 2.0 is supported.

[0111] FIG. **10** is a signal flowchart of a WFD communication according to an exemplary embodiment.

[0112] A probe request message **1002** and a probe response message **1003** are exchanged during a device discovery procedure **1001** between a source device **1012** and a sink device **1013**. Information related to the content protection capability of the device may be included in the probe request message **1002** and the probe response message **1003**, and thus information related to the content protection capability may be exchanged between the source device **1012** and the sink device **1013**.

[0113] In accordance with one or more exemplary embodiments, the service discovery procedure **1004** is optional, and whether the procedure is to be performed is determined according to whether the device supports the content protection capability as described with reference to FIG. **9**. When the service discovery procedure **1004** is performed, the information related with the content protection capability may be exchanged at the service discovery procedure **1004**.

[0114] The information related with the content protection capability of the device is exchanged before the connection setup procedure **1005**, and information related with the content protection capability of the devices is displayed to users **1011** and **1014** of respective devices. The user may select the device with which a connection setup procedure is to be performed based on information related with the content protection performance of the displayed device.

[0115] After the information related with the content protection capability is exchanged, the connection setup procedure **1005** is performed with the device selected by the user's input, and thereafter a capability negotiation procedure **1006** is performed. In the capability negotiation procedure **1006**, the device that is to play a role of an access point (AP) and a station is determined as in a general Wi-Fi direct scheme. Furthermore, information related with the content protection capability may be set to be exchanged in the capability negotiation procedure.

[0116] One or more exemplary embodiments can also be embodied as computer readable codes 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 read-only memory (ROM), random-access memory (RAM), CD-ROMs, magnetic tapes, floppy disks, optical data storage devices, etc. 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.

[0117] While exemplary embodiments have been shown and described with reference to exemplary embodiments thereof, it will be understood by those of ordinary skill in the art that various changes in form and details may be made therein without departing from the spirit and scope of the inventive concept as defined by the following claims.

1. A method of performing communication between a first device and a second device by using a Wi-Fi direct scheme, the method comprising:

receiving, by the first device, information relating to a content protection capability of the second device during a device discovery procedure; and

determining, by the first device, whether to perform a connection setup procedure with the second device based on the received information relating to the content protection capability of the second device.

2. The method of claim **1**, wherein the receiving the information related to the content protection capability of the second device comprises receiving a probe response message including the information relating to the content protection capability.

3. The method of claim **1**, further comprising:

transmitting, from the first device, information relating to a content protection capability of the first device to the second device,

wherein the information relating to the content protection capability of the second device is received in response to the transmitted information relating to the content protection capability of the first device.

4. The method of claim **3**, wherein the transmitting the information relating to the content protection capability of the first device comprises transmitting a probe request message including the information related to the content protection capability of the first device.

5. The method of claim **1**, wherein the information relating to the content protection capability is included in a Wi-Fi Display Information Element (WFD IE).

6. The method of claim **5**, wherein the information relating to the content protection capability is included in a Wi-Fi Display (WFD) Device Information Field within the WFD IE.

7. The method of claim **1**, wherein the information relating to the content protection capability indicates whether a high-definition content protection 2.0 (HDCP 2.0) is supported.

8. A device for performing communication using a Wi-Fi direct scheme, the device comprising:

a receiver configured to receives information relating to a content protection capability of a second device in a device discovery procedure; and

a determination processor configured to determine whether to perform a connection setup procedure with the second device based on the received information relating to the content protection capability.

9. The device of claim **8**, wherein the receiver is further configured to receive a probe response message including the information relating to the content protection capability.

10. The device of claim **8**, further comprising:

a transmitter configured to transmit information relating to a content protection capability of the device to the second device,

wherein the information relating to the content protection capability of the second device is received in response to the transmitted information relating to the content protection capability of the device.

11. The device of claim **10**, wherein the transmitter is further configured to transmit a probe request message including the information relating to the content protection capability.

12. The device of claim **8**, the information relating to the content protection capability is included in a Wi-Fi Display Information Element (WFD IE).

13. The device of claim **12**, wherein the information relating to the content protection capability is included in a Wi-Fi Display (WFD) Device Information Field within the WFD IE.

14. The device of claim **8**, wherein the information relating to the content protection capability indicates whether a high-definition content protection 2.0 (HDCP 2.0) is supported.

15. A computer-readable recording medium having recorded a program for implementing a method disclosed claim **1**.

16. A method of performing communication between a first device and a second device in accordance with a Wi-Fi Direct standard, the method comprising:

transmitting from the first device to the second device a data frame comprising a field containing content protection capability information relating to a first device.

17. The method of the claim **16**, wherein the data frame is in a Wi-Fi Display Information Element (WFD IE) frame format.

18. The method of the claim **17**, wherein the content protection capability information relating to the first device is in a Wi-Fi Display (WFD) Device Information Field as defined by the WFD IE frame format.

19. The method of the claim **16**,

wherein the data frame is configured to be received at a second device prior to a connection setup procedure with the first device, and

wherein the second device is configured to determine whether to connect to the first device based on the received data frame.

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