Description

Title of Invention: COMMUNICATION APPARATUS AND COMMUNICATION METHOD FOR ENHANCED TUNNELLED DIRECT LINK SETUP

TECHNICAL FIELD

[001] The present disclosure generally relates to communication methods and apparatuses, and more particularly relates to methods and apparatuses for enhanced tunnelled direct link setup (TDLS).

BACKGROUND

[002] Tunnelled direct link setup (TDLS) allows direct peer to peer communication between two non-access point (non-AP) stations (STAs) in an 802.11 BSS. All management frames involved in the setup of TDLS (except TDLS Discovery Response) are encapsulated within Data frames, so the setup of TDLS is completely transparent to an AP associated with the non-AP STAs. In fact, the AP does not even need to be TDLS capable.

[003] However, there is still limited discussion on communication apparatuses and methods for enhanced TDLS.

[004] There is thus a need for communication apparatuses and methods that can solve the above-mentioned issues. Furthermore, other desirable features and characteristics will become apparent from the subsequent detailed description and the appended claims, taken in conjunction with the accompanying drawings and this background of the disclosure.

SUMMARY

[005] Non-limiting and exemplary embodiments facilitate providing communication apparatuses and communication methods for enhanced TDLS.

[005a] According to an aspect, the present disclosure refers to an access point comprising:
a receiver, which in operation, receives, from another access point, a request frame including information for peer-to-peer communication between a wireless communication apparatus associated with the access point and another wireless communication apparatus; and
a transmitter, which in operation, transmits the information for peer-to-peer communication to the wireless communication apparatus associated with the access point.

[005b] According to an aspect, the present disclosure refers to a communication method by an access point, the method comprising:
receiving, from another access point, a request frame including information for peer-to-peer communication between a wireless communication apparatus associated with the access point and another wireless communication apparatus; and
transmitting the information for peer-to-peer communication to the wireless communication apparatus associated with the access point.

[006] According to an example of the present disclosure, there is provided a first wireless communication apparatus associated to a first access point (AP), the first wireless communication apparatus comprising: a transmitter, which in operation, transmits a request frame to a second wireless communication apparatus which is associated to a second AP for peer-to-peer

communication; and a receiver, which in operation, receives a response frame from the second wireless communication apparatus in response to the request frame.

[007] According to another example of the present disclosure, there is provided a second wireless communication apparatus associated to a second AP, the second wireless communication apparatus comprising: a receiver, which in operation, receives a request frame from a first wireless communication apparatus via a first AP associated with the first wireless communication apparatus and the second AP, the request frame indicating a request for peer-to-peer communication with the second wireless communication apparatus; and a transmitter, which in operation, transmits a response frame to the first wireless communication apparatus in response to the request frame.

[008] According to another example of the present disclosure, there is provided a communication method comprising: transmitting, from a first wireless communication apparatus, a request frame to a second wireless communication apparatus via a first AP associated with the first wireless communication apparatus and a second AP associated with the second wireless communication apparatus, the request frame indicating a request for peer-to-peer communication with the second wireless communication apparatus; and receiving a response frame from the second wireless communication apparatus in response to the request frame.

[009] It should be noted that general or specific embodiments may be implemented as a system, a method, an integrated circuit, a computer program, a storage medium, or any selective combination thereof. Additional benefits and advantages of the disclosed embodiments will become apparent from the specification and drawings. The benefits and/or advantages may be individually obtained by the various embodiments and features of the specification and drawings, which need not all be provided in order to obtain one or more of such benefits and/or advantages.

BRIEF DESCRIPTION OF THE DRAWINGS

[0010] The accompanying figures where like reference numerals refer to identical or functionally similar elements throughout the separate views and which together with the detailed description below are incorporated in and form part of the specification, serve to illustrate various embodiments and to explain various principles and advantages in accordance with present embodiments.

CLAIMS

1. An access point comprising:

a receiver, which in operation, receives, from another access point, a request frame including information for peer-to-peer communication between a wireless communication apparatus associated with the access point and another wireless communication apparatus; and

a transmitter, which in operation, transmits the information for peer-to-peer communication to the wireless communication apparatus associated with the access point.

2. The access point according to Claim 1, wherein the information for peer-to-peer communication includes information on channel to be used in the peer-to-peer communication.

3. The access point according to Claim 1, wherein the access point is connected to the another access point via a wireless backhaul, and

the receiver receives the request frame from the another access point via the wireless backhaul.

4. The access point according to Claim 1, wherein the access point is connected to the another access point via a wired backhaul, and

the receiver receives the information for peer-to-peer communication from the another access point via the wired backhaul.

5. The access point according to Claim 1, wherein the another wireless communication apparatus is a wireless communication apparatus associated with the another access point.

6. The access point according to Claim 5, wherein the request frame is generated by the another access point based on a frame received from the wireless communication apparatus.

7. The access point according to Claim 6, wherein the request frame is a Tunnelled Direct-link Setup (TDLS) discovery request frame, an Access Network Query Protocol (ANQP) request frame, or a TDLS setup request frame.

8. The access point according to Claim 6, wherein the another access point and the another wireless communication apparatus belong to a first Basic Service Set (BSS), and the

access point and the wireless communication apparatus associated with the access point belong to a second BSS different from the first BSS.

9. The access point according to Claim 6, wherein the access point and the another access point are part of a plurality of collocated access points, and the plurality of collocated access points are implemented on the same physical access point device.

10. A communication method by an access point, the method comprising:

receiving, from another access point, a request frame including information for peer-to-peer communication between a wireless communication apparatus associated with the access point and another wireless communication apparatus; and

transmitting the information for peer-to-peer communication to the wireless communication apparatus associated with the access point.