SUMMARY

[0005] In one aspect, the present disclosure provides a non-Access Point (non-AP) Multi-link Device (MLD)comprising: circuitry, which in operation, generates an Association Request frame that includes an MLD MAC address field for specifying a MAC address of the non-AP MLD, link address information that indicates requested links and link specific information of the requested links; and a transmitter, which in operation, transmits the Association Request frame to an Access Point (AP) MLD to request a multi-link setup between the non-AP MLD and the AP MLD.

[0006] In one example, a second STA is included in a second plurality of STAs affiliated with a second Multi-link Device (MLD), the second STA comprising: a receiver, which in operation, receives a request frame from a first STA, wherein the first STA is included in a first plurality of STAs affiliated with a first MLD, and wherein the request frame comprises request information and is requesting for a multi-link setup that establishes one or more links between one or more STAs of the first plurality of STAs and corresponding one or more STAs of the second plurality of STAs based on the request information; and a transmitter, which in operation, transmits a response frame to the first STA to inform the result of the multi-link setup, wherein the response frame carries information of the one or more links that have been established between the one or more STAs of the first plurality of STAs and the corresponding one or more STAs of the second plurality of STAs.

[0007] In another aspect, the present disclosure includes a communication method for a non-Access Point (non-AP) Multi-link Device (MLD), a communication method comprising: generating an Association Request frame that includes an MLD MAC address field for specifying a MAC address of the non-AP MLD, link address information that indicates requested links and link specific information of the requested links; and transmitting the Association Request frame to an Access Point (AP) MLD to request a multi-link setup between the non-AP MLD and the AP MLD.

[0008] 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

[0009] 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.

[0010] FIG. 1 illustrates a relationship between coverage frequency and range of a wireless node.

CLAIMS

1. A non-Access Point (non-AP) Multi-link Device (MLD) comprising:

circuitry, which in operation, generates an Association Request frame that includes an MLD MAC address field for specifying a MAC address of the non-AP MLD, link address information that indicates requested links and link specific information of the requested links; and

a transmitter, which in operation, transmits the Association Request frame to an Access Point (AP) MLD to request a multi-link setup between the non-AP MLD and the AP MLD.

2. The non-AP MLD according to claim 1, wherein the Association Request frame includes a Multi-Link element that includes the MLD MAC Address field.

3. The non-AP MLD according to claim 1, wherein the Association Request frame includes a Multi-Link element that includes one or more link information fields, each link information field indicating one of the requested links and its link specific information.

4. The non-AP MLD according to claim 1, wherein the link specific information includes operational parameters of the requested links.

5. The non-AP MLD according to claim 1, wherein

prior to the multi-link setup,

the circuitry, in operation, generates an Authentication frame comprising a MAC address of the non-AP MLD; and

the transmitter, in operation, transmits the Authentication frame to the AP MLD for multi-link authentication.

6. The non-AP MLD according to claim 1, wherein the transmitter, in operation, transmits a Re-setup Request frame for establishing a new link between the non-AP MLD and the AP MLD, the new link being independent of the established one or more links.

7. The non-AP MLD according to claim 1, wherein the transmitter transmits the Association Request frame on a link that the non-AP MLD desires to use as part of the multi-link setup.

8. The non-AP MLD according to claim 1, comprising

a receiver, which in operation, receives an Association Response frame that indicates one or more links that are accepted by the AP MLD.

9. The non-AP MLD according to claim 8, wherein the Association Response frame is received on a link on which the Association Request frame is transmitted .

10. The non-AP MLD according to claim 1, wherein the non-AP MLD includes a plurality of associated stations (STAs) and the AP MLD includes a plurality of associated APs, multi-link being to be set up between the plurality of associated STAs and the plurality of associated APs over different frequency channels.

11. A communication method for a non-Access Point (non-AP) Multi-link Device (MLD), the communication method comprising:

generating an Association Request frame that includes an MLD MAC address field for specifying a MAC address of the non-AP MLD, link address information that indicates requested links and link specific information of the requested links; and

transmitting the Association Request frame to an Access Point (AP) MLD to request a multi-link setup between the non-AP MLD and the AP MLD.

12. The communication method according to claim 11, wherein the Association Request frame includes a Multi-Link element that includes the MLD MAC Address field.

13. The communication method according to claim 11, wherein the Association Request frame includes a Multi-Link element that includes one or more link information fields, each link information field indicating one of the requested links and its link specific information.

14. The communication method according to claim 11, wherein the link specific information includes operational parameters of the requested links.

15. The communication method according to claim 11, wherein

prior to the multi-link setup,

generating an Authentication frame that comprises a MAC address of the non-AP MLD; and

transmitting the Authentication frame to the AP MLD for multi-link authentication.

16. The communication method according to claim 11, the communication method comprising:

transmitting a Re-setup Request frame for establishing a new link between the non-AP MLD and the AP MLD, the new link being independent of the established one or more links.

17. The communication method according to claim 11, wherein the Association Request frame is transmitted on a link that the non-AP MLD desires to use as part of the multi-link setup.

18. The communication method according to claim 11, the communication method comprising:

receiving an Association Response frame that indicates one or more links that are accepted by the AP MLD.

19. The communication method according to claim 17, wherein the Association Response frame is received on a link on which the Association Request frame is transmitted.

20. The communication method according to claim 11, wherein the non-AP MLD includes a plurality of associated stations (STAs) and the AP MLD includes a plurality of associated APs, multi-link being to be set up between the plurality of

associated STAs and the plurality of associated APs over different frequency channels.