CLAIMS

1. A multi-link wireless access point, AP, (110) configured to exchange a plurality of frames via a plurality of setup links with a plurality of multi-link wireless non-AP stations (120) in a wireless communication network (100), wherein the multi-link wireless AP (110) comprises:
a communication interface (113) configured to send a management frame to at least one of the plurality of multi-link wireless non-AP stations (120) operating on a first setup link of the plurality of setup links, wherein the management frame comprises information for the at least one of the plurality of multi-link wireless non-AP stations (120) for identifying at least the first setup link of the plurality of setup links to be disabled; and
a processing circuitry (111) configured to, in response to sending the management frame, disable at least the first setup links,
wherein the communication interface (113) is configured to send the management frame to the at least one of the plurality of multi-link wireless non-AP stations (120) operating on the first setup link via the first setup link to be disabled by the multi-link wireless AP (110).

2. The multi-link wireless AP (110) of claim 1, wherein the plurality of setup links comprises at least one disabled setup link and wherein the communication interface (113) is further configured to send a further management frame to at least one of the plurality of multi-link wireless non-AP stations (120), wherein the further management frame comprises information for the at least one of the plurality of multi-link wireless non-AP stations (120) for identifying the at least one disabled setup link to be enabled, and wherein the processing circuitry (111) is further configured, in response to sending the further management frame, to enable the at least one disabled setup link.

3. The multi-link wireless AP (110) of claim 1 or 2, wherein the management frame is a unicast management frame sent to one of the plurality of multi-link wireless non-AP stations (120) and wherein the communication interface (113) is configured to receive an acknowledgment frame from the one multi-link wireless non-AP station (120), in response to sending the management frame to the one multi-link wireless non-AP station (120).

4. The multi-link wireless AP (110) of claim 3, wherein the processing circuitry (111) is configured to disable at least the first setup link, in response to sending the management frame to the one multi-link wireless non-AP station (120) and receiving the acknowledgement frame.

5. The multi-link wireless AP (110) of claim 1 or 2, wherein the management frame is a broadcast management frame and wherein the processing circuitry (111) is configured to disable at least the first setup link, in response to sending the management frame to all of the plurality of multi-link wireless non-AP stations (120) operating on the first setup link.

6. The multi-link wireless AP (110) of any one of the preceding claims, wherein the plurality of frames comprises a plurality of data frames and wherein each data frame comprises a corresponding transmission identifier, TID, to which it corresponds of a plurality of TIDs and wherein the processing circuitry (111) is configured to map each TID to one or more of the plurality of setup links.

7. The multi-link wireless AP (110) of claim 6, wherein the communication interface (113) is configured to send each data frame, depending on the TID of the data frame, via the one or more setup links the TID is mapped to.

8. The multi-link wireless AP (110) of claim 6 or 7, wherein the information of the management frame comprises for one or more of the plurality of TIDs a bitmap defining the one or more of the plurality of setup links to which each TID is mapped to.

9. The multi-link wireless AP (110) of claim 8, wherein the bitmaps defining the one or more of the plurality of setup links to which each TID is mapped are valid until the communication interface (113) sends a further management frame which includes the bitmaps defining the one or more of the plurality of setup links to which each TID is mapped, to the at least one of the plurality of multi-link wireless non-AP stations (120).

10. The multi-link wireless AP (110) of claim 8 or 9, wherein for at least the first setup link to be disabled by the multi-link wireless AP (110) each bitmap defines that none of the plurality of TIDs is mapped to at least the first setup link to be disabled by the multi-link wireless AP (110).

11. The multi-link wireless AP (110) of any one of claims 8 to 10, wherein the plurality of TIDs comprises up to 8 TIDs and wherein the bitmap for each TID comprises 2 octets.

12. The multi-link wireless AP (110) of any one of claims 6 to 10, wherein the plurality of setup links comprises at least one disabled setup link and wherein the communication interface (113) is further configured to send a further management frame to at least one of the plurality of multi-link wireless non-AP stations (120), wherein the further management frame comprises a default mapping indication for informing the at least one of the plurality of multi-link wireless non-AP stations (120) about a default mapping of the plurality of TIDs to the plurality of setup links, wherein the default mapping defines that all of the plurality of TIDs are mapped to all of the plurality of setup links.

13. The multi-link wireless AP (110) of any one of claims 6 to 12, wherein the management frame further comprises information for defining whether the mapping defined by the one or more bitmaps is for a downlink, DL, communication direction or an uplink, UL, communication direction between the multi-link wireless AP (110) and the plurality of multi-link wireless non-AP stations (120).

14. The multi-link wireless AP (110) of any one of claims 6 to 13, wherein the management frame further comprises information for identifying one or more of the plurality of TIDs for which the one or more bitmaps define the mapping of the respective TID to one or more of the plurality of setup links.

15. The multi-link wireless AP (110) of claim 5, wherein the information of the management frame comprises a plurality of bitmaps, wherein the plurality of bitmaps define for one or more of the plurality of TIDs and for at least two of the plurality of multi-link wireless non-AP stations (120) the one or more of the plurality of setup links to which the TID is mapped and wherein the management frame further comprises information for associating the one or more bitmaps with each of the at least two of the plurality of multi-link wireless non-AP stations (120), wherein each bitmap defines the one or more of the plurality of setup links to which the respective TID is mapped.

16. The multi-link wireless AP (110) of claim 15, wherein the plurality of bitmaps comprise for each of the one or more of the plurality of TIDs a single bitmap defining for the plurality of multi-link wireless non-AP stations (120) the one or more of the plurality of setup links to which the TID is mapped to.

17. A method (300) performed by a multi-link wireless access point, AP, (110) configured to exchange a plurality of frames via a plurality of setup links with a plurality of multi-link wireless non-AP stations (120) in a wireless communication network (100), wherein the method (300) comprises:
sending (301) a management frame to at least one of the plurality of multi-link wireless non-AP stations (120) operating on a first setup link of the plurality of setup links, wherein the management frame comprises information for the at least one of the plurality of multi-link wireless non-AP stations (120) for identifying at least the first setup link of the plurality of setup links to be disabled; and
in response to sending the management frame, disabling (303) at least the first setup link,
wherein the management frame is sent to the at least one of the plurality of multi-link wireless non-AP stations (120) operating on the first setup link via the first setup link to be disabled by the multi-link wireless AP (110).

18. The method (300) of claim 17, wherein the management frame is a broadcast management frame and wherein disabling (303) at least the first setup link comprises immediately disabling at least the first setup link, in response to sending the broadcast management frame.

19. The method (300) of claim 17, wherein the management frame is a unicast management frame and wherein the method (300) further comprises receiving an acknowledgement frame, wherein disabling (303) at least the first setup link comprises disabling at least the first setup link, in response to sending the unicast management frame and receiving the acknowledgement frame.

20. The method (300) of any one of claims 17 to 19, wherein the plurality of setup links comprises at least one disabled setup link and wherein the method (300) further comprises sending a further management frame to at least one of the plurality of multi-link wireless non-AP stations (120), wherein the further management frame comprises information for the at least one of the plurality of multi-link wireless

non-AP stations (120) for identifying the at least one disabled setup link to be enabled, and enabling the at least one disabled setup link, in response to sending the further management frame.

21. The method (300) of claim 20, wherein the further management frame is a further broadcast management frame and wherein enabling the at least one disabled setup link comprises immediately enabling the at least one disabled setup link, in response to sending the broadcast management frame.

22. The method (300) of claim 20, wherein the management frame is a unicast management frame and wherein the method (300) further comprises receiving a further acknowledgement frame, wherein enabling the at least one disabled setup link comprises enabling the at least one disabled setup link, in response to sending the unicast management frame and receiving the further acknowledgement frame.

23. A multi-link wireless non-access point, non-AP, station (120) configured to exchange a plurality of frames via a plurality of setup links with a multi-link wireless AP (110) in a wireless communication network (100), wherein the multi-link wireless non-AP station (120) comprises:
a communication interface (123) to receive a management frame from the multi-link wireless AP (110); and
a processing circuitry (121) configured to extract information from the management frame for identifying at least a first setup link of the plurality of setup links to be disabled;
wherein the processing circuitry (121) is further configured to disable at least the first setup link,
wherein the communication interface (123) is configured to receive the management frame from the multi-link wireless AP (110) via the first setup link to be disabled.

24. The multi-link wireless non-AP station (120) of claim 23, wherein the management frame is a unicast frame and wherein the communication interface (123) is further configured to send, in response to receiving the individually addressed unicast management frame from the multi-link wireless AP (110), an acknowledgment frame to the multi-link wireless AP (110).

25. The multi-link wireless non-AP station (120) of claim 23 or 24, wherein the plurality of setup links comprises at least one disabled setup link and wherein the communication interface (123) is configured to receive a further management frame from the multi-link wireless AP (110), wherein the processing circuitry (121) is configured to extract further information from the further management frame for identifying the at least one disabled setup link to be enabled, wherein the processing circuitry (121) is further configured to enable the at least one disabled setup link.

26. The multi-link wireless non-AP station (120) of claim 25, wherein the further management frame is a unicast management frame and wherein the communication interface (123) is further configured to send, in response to receiving the individually addressed further management frame from the multi-link wireless AP (110), a further acknowledgment frame to the multi-link wireless AP (110).

27. The multi-link wireless non-AP station (120) of any one of claims 21 to 26, wherein the plurality of frames comprises a plurality of data frames and wherein each data frame comprises a corresponding transmission identifier, TID, of a plurality of TIDs and wherein the processing circuitry (121) is configured to map each TID to one or more of the plurality of setup links.

28. The multi-link wireless non-AP station (120) of claim 27, wherein the communication interface (123) is configured to send each data frame, depending on the TID of the data frame, via the one or more setup links the TID is mapped to.

29. The multi-link wireless non-AP station (120) of claim 27 or 28, wherein the information of the management frame comprises for one or more of the plurality of TIDs a bitmap defining the one or more of the plurality of setup links to which each TID is mapped to.

30. The multi-link wireless non-AP station (120) of claim 29, wherein the processing circuitry (121) is configured to identify at least the first setup link based on the plurality of bitmaps by determining that for at least the first setup link to be disabled by the multi-link wireless AP (110) each bitmap defines that none of the plurality of TIDs is mapped to at least the first setup link to be disabled by the multi-link wireless AP (110).

31. The multi-link wireless non-AP station (120) of claim 29 or 30, wherein the processing circuitry (121) is configured to identify at least one disabled setup link based on the plurality of bitmaps by determining that for the at least one disabled setup link to be enabled by the multi-link wireless AP (110) at least one bitmap of the plurality of bitmaps defines that at least one of the plurality of TIDs is mapped to the at least one disabled setup link to be enabled by the multi-link wireless AP (110).

32. The multi-link wireless non-AP station (120) of claim 31, further comprising a memory (125) configured to maintain the plurality of bitmaps defining the one or more of the plurality of setup links to which each TID is mapped, wherein the processing circuitry (121) is configured to update the plurality of bitmaps stored within the memory based on the bitmaps contained within the link disable management frame and/or the link enable management frame and to identify, based on the plurality of bitmaps stored within the memory (125), at least the first setup link of the plurality of setup links to be temporarily disabled by the multi-link wireless AP (110) and/or the at least one disabled setup link to be enabled by the multi-link wireless AP (110).

33. The multi-link wireless non-AP station (120) of any one of claims 29 to 32, wherein the management frame is a broadcast management frame and wherein the processing circuitry (121) is further configured to extract an association identifier of the multi-link wireless non-AP station (120) from the broadcast management frame for identifying a subset of the plurality of bitmaps for the multi-link wireless non-AP station (120), wherein the subset of the plurality of bitmaps defines for one or more of the plurality of TIDs the one or more of the plurality of setup links to which the TID is mapped.

34. The multi-link wireless non-AP station (120) of claim 33, wherein the processing circuitry (121) is configured to extract the subset of the plurality of bitmaps from the management frame for identifying at least the first setup link of the plurality of setup links to be disabled, if the broadcast management frame comprises the association identifier of the multi-link wireless non-AP station (120).

35. A method (400) performed by a multi-link wireless non-access point, non-AP, station (120) configured to exchange a plurality of frames via a plurality of setup links with a multi-link wireless AP (110) in a wireless communication network (100), wherein the method (400) comprises:
receiving (401) a management frame from the multi-link wireless AP (110);
extracting (403) information from the management frame for identifying at least a first setup link of the plurality of setup links to be disabled; and
disabling (405) at least the first setup link,
wherein the management frame is received from the multi-link wireless AP (110) via the first setup link to be disabled.

36. The method (400) of claim 35, wherein the management frame is a broadcast management frame and wherein disabling (405) at least the first setup link comprises disabling at least the first setup link, in response to receiving the broadcast management frame.

37. The method (400) of claim 35, wherein the management frame is a unicast management frame and wherein the method (400) further comprises sending an acknowledgement frame to the multi-link wireless AP (110), wherein the step of disabling (405) at least the first setup link comprises disabling at least the first setup link, in response to receiving the unicast management frame and sending the acknowledgement frame to the multi-link wireless AP (110).

38. The method (400) of any one of claims 35 to 37, wherein the plurality of setup links comprises at least one disabled setup link and wherein the method (400) further comprises:
receiving a further management frame from the multi-link wireless AP (110);
extracting further information from the further management frame for identifying the at least one disabled setup link to be enabled; and
enabling the at least one disabled setup link.

39. The method (400) of claim 38, wherein the further management frame is a broadcast management frame and wherein enabling the at least one disabled setup link comprises enabling the at least one disabled setup link, in response to receiving the broadcast management frame.

40. The method (400) of claim 38, wherein the further management frame is a unicast management frame and wherein the method (400) further comprises sending a further acknowledgement frame to the multi-link wireless AP (110), wherein the step of enabling the at least one disabled setup link comprises enabling the at least one disabled setup link, in response to receiving the further management frame and sending the further acknowledgement frame to the multi-link wireless AP (110).

41. A computer program product comprising a computer-readable storage medium for storing program code which when executed by a computer or a processor of a multi-link wireless access point, causes the multi-link wireless access point to perform the method (300) of any one of claims 17 to 22 or when executed by a computer or a processor of a multi-link wireless non-access point, causes the multi-link non-wireless access point to perform the method (400) of any one of claims 35 to 40.