

CLAIMS

What is claimed is:

1. A communications method, comprising:

5 sending, by a first station in a first multi-link device, first information to a second multi-link device, wherein the first information is used to indicate a frequency at which a station in a power saving mode in the first multi-link device receives a beacon frame; and

receiving, by the first multi-link device, the beacon frame based on the first information.

2. The method according to claim 1, wherein the first information indicates a first time interval at which a second station operating on a first link in the first multi-link device receives a beacon frame, and a unit of the first time interval is an interval of beacon frames on the first link.

3. The method according to claim 1 or 2, wherein the first station is the same as or different from the second station.

4. The method according to claim 2 or 3, wherein the receiving, by the first multi-link device, the beacon frame based on the first information comprises:

15 receiving, by a station in the first multi-link device on the first link, the beacon frame at an interval of the first time interval.

5. The method according to claim 1, wherein the first information indicates a second time interval at which a plurality of stations operating on a plurality of links in the first multi-link device receive a beacon frame, the second time interval is related to a plurality of beacon frame intervals at which the second multi-link device sends a beacon frame on the plurality of links, and each beacon frame interval is an interval at which a station in the second multi-link device sends a beacon frame on a link.

6. The method according to claim 5, wherein a unit of the second time interval is a largest time interval in the plurality of beacon frame intervals at which the second multi-link device sends a beacon frame on the plurality of links, or a smallest time interval in the plurality of beacon frame intervals.

7. The method according to claim 5 or 6, wherein the receiving, by the first multi-link device, the beacon frame based on the first information comprises:

30 receiving, by the first multi-link device, the beacon frame on at least one of the plurality of links at an interval of the second time interval.

8. The method according to any one of claims 1 to 7, wherein the sending, by a first station in a first multi-link device, first information to a second multi-link device comprises:

sending, by the first station in the first multi-link device, a first frame to the second multi-link device, wherein the first frame carries the first information.

5 9. The method according to claim 8, wherein the first frame is an association request frame or a re-association request frame.

10. A communications method, comprising:

receiving, by a second multi-link device, first information from a first multi-link device, wherein the first information is used to indicate a frequency at which a station in a power saving mode in the first multi-link device receives a beacon frame; and

sending, by the second multi-link device, the beacon frame based on the first information.

11. The method according to claim 10, further comprising:

determining, by the second multi-link device based on the first information, a lifetime of a service of the first multi-link device.

12. The method according to claim 10, further comprising:

when time that the second multi-link device caches the service of the first multi-link device is less than time indicated by the first information, skipping discarding, by the second multi-link device, a cache service of the first multi-link device.

13. The method according to claim 10, further comprising:

20 when time that the second multi-link device caches the service of the first multi-link device is greater than time indicated by the first information, discarding, by the second multi-link device, a cache service of the first multi-link device.

14. The method according to any one of claims 10 to 13, wherein the receiving, by a second multi-link device, first information from a first multi-link device comprises:

25 receiving, by the second multi-link device, a first frame from the first multi-link device, wherein the first frame carries the first information.

15. The method according to claim 14, wherein the first frame is an association request frame or a re-association request frame.

16. A communications method, comprising:

30 sending, by a first station in a first multi-link device, a first frame to a second multi-link device, wherein the first frame comprises a plurality of pieces of second information, and each of

the plurality of pieces of second information is used to indicate a frequency at which a station in a power saving mode in the first multi-link device receives a beacon frame; and

receiving, by the first multi-link device, a beacon frame based on the plurality of pieces of second information.

5 17. The method according to claim 16, wherein the first frame further comprises link identifiers of a plurality of stations, each link identifier corresponds to one piece of second information, and the link identifier is used to identify a station in the first multi-link device.

18. The method according to claim 16 or 17, wherein the first frame is an association request frame or a re-association request frame.

10 19. A communications method, comprising:

receiving, by a second multi-link device, a first frame from a first multi-link device, wherein the first frame comprises a plurality of pieces of second information, and each of the plurality of pieces of second information is used to indicate a frequency at which a station in a power saving mode in the first multi-link device receives a beacon frame; and

15 sending, by the second multi-link device, the beacon frame based on the plurality of pieces of second information.

20. The method according to claim 19, wherein the first frame further comprises link identifiers of a plurality of stations, each link identifier corresponds to one piece of second information, and the link identifier is used to identify a station in the first multi-link device.

20 21. The method according to claim 19 or 20, wherein the first frame is an association request frame or a re-association request frame.

22. A communications apparatus, comprising a processing circuit and an interface circuit, wherein the processing circuit is configured to control the interface circuit to implement the method according to any one of claims 1 to 9, 10 to 15, 16 to 18, or 19 to 21.

25 23. A computer-readable storage medium, wherein the storage medium stores a program or instructions; and when the program or the instructions are run, the method according to any one of claims 1 to 9, 10 to 15, 16 to 18, or 19 to 21 is implemented.

24. A communications apparatus, configured to perform the method according to any one of claims 1 to 9, 10 to 15, 16 to 18, or 19 to 21.

30 25. A computer program product, comprising instructions, wherein when the instructions are run, the method according to any one of claims 1 to 9, 10 to 15, 16 to 18, or 19 to 21 is implemented.

CLAIMS

What is claimed is:

1. A communications method, comprising:

5 sending, by a station in a STA multi-link device, a first frame, to an AP in an AP multi-link device, the first frame comprises first information indicating a frequency at which one or more stations in the STA multi-link device receive a beacon frame, the one or more stations are in a power saving mode;

10 receiving, by the station in the STA multi-link device, a second frame, from the AP in the AP multi-link device.

2. The method according to claim 1, the STA multi-link device includes the one or more stations, the AP multi-link device includes one or more APs, the first frame is used to request the one or more stations in the STA multi-link device associate with the one or more APs in the AP multi-link device correspondingly.

15 3. The method according to claim 1 or claim 2, the first frame is Association Request frame, the second frame is Association Response frames; or

 the first frame is ReAssociation Request frame, the second frame is ReAssociation Response frame.

20 4. The method according to any one of claims 1 to 3, the first information is carried in a listen interval field of an Association Request frame, or

 the first information is carried in a listen interval field of a ReAssociation Request frame.

25 5. The method according to any one of claims 1 to 4, the first information indicates a time interval within which the one or more stations in the STA multi-link device receive a beacon frame, the time interval is related to one or more beacon frame intervals at which the AP multi-link device sends a beacon frame on the one or more links, where each beacon frame interval is an interval at which an AP in the AP multi-link device sends a beacon frame on a link.

6. The method according to claim 5, the time interval is greater than a threshold, the second frame comprises third information, the third information is used to indicate rejecting the association request of the station in a STA multi-link device.

30 7. The method according to claim 5, value "0" of the time interval indicates the one or more

stations in the STA multi-link device never enter power save mode.

8. The method according to any one of claims 1 to 7, the first information is used to determine the lifetime of cache service of the STA multi-link device.

5 9. The method according to any one of claims 1 to 8, the first information is used to determine an age function, wherein the age function is used to determine whether to discard the cache service of the STA multi-link device.

10 10. The method according to any one of claims 5 to 9, the unit of the time interval is a largest time interval in the one or more beacon frame intervals at which the AP multi-link device sends a beacon frame on the one or more links.

11. The method according to claim 10, the method further comprise:
receiving, by at least one station in the STA multi-link device, a beacon frame within the time interval.

12. A communications method, comprising:
15 receiving, by an AP in an AP multi-link device, a first frame, from a station in a STA multi-link device, the first frame comprises first information indicating a frequency at which one or more stations in the STA multi-link device receive a beacon frame, the one or more stations are in a power saving mode;

sending, by the AP in an AP multi-link device, a second frame based on first information, to
20 the station in the STA multi-link device.

13. The method according to claim 12, the STA multi-link device includes the one or more stations, the AP multi-link device includes one or more APs, the first frame is used to request the one or more stations in the STA multi-link device associate with the one or more APs in the AP multi-link device correspondingly.

25 14. The method according to claim 12 or claim 13, the first frame is Association Request frame, the second frame is Association Response frames; or
the first frame is ReAssociation Request frame, the second frame is ReAssociation Response frame.

15. The method according to any one of claims 12 to 14, the first information is carried in a
30 listen interval field of an Association Request frame, or
the first information is carried in a listen interval field of a ReAssociation Request frame.

16. The method according to any one of claims 12 to 15, the first information indicates a time interval within which the one or more stations in the STA multi-link device receive a beacon frame, the time interval is related to one or more beacon frame intervals at which the AP multi-link device sends a beacon frame on the one or more links, where each beacon frame interval is an interval at which an AP in the AP multi-link device sends a beacon frame on a link.

17. The method according to claim 16, the time interval is greater than a threshold, the second frame comprises third information, the third information is used to indicate rejecting the association request of the station in a STA multi-link device.

18. The method according to claim 17, value "0" of the time interval indicates the one or more stations in the STA multi-link device never enter power save mode.

19. The method according to any one of claims 12 to 17, the AP multi-link device determines the lifetime of cache service of the STA multi-link device based on the first information.

20. The method according to claim 19, the AP multi-link device determines an age function based on the first information, and determines whether to discard the cache service of the STA multi-link device based on the age function.

21. The method according to claim 16 or 17, the unit of the time interval is a largest time interval in the one or more beacon frame intervals at which the AP multi-link device sends a beacon frame on the one or more links.

22. The method according to claim 21, the method further comprise:

sending, by at least one AP in the AP multi-link device, a beacon frame.

23. A communications method, comprising:

sending, by a station in a STA multi-link device, a WNM sleep request frame, to an AP in an AP multi-link device, the WNM sleep request frame carries WNM sleep interval, the WNM sleep interval is used to indicate a frequency at which one or more stations in the WNM sleep state in the STA multi-link device receive a beacon frame;

receiving, by the station in the STA multi-link device, a WNM sleep response frame, from the AP in the AP multi-link device.

24. The method according to claim 23, the WNM sleep interval is applied to the one or more stations in the station multi-link device.

25. The method according to claim 23 or 24, the WNM sleep interval is greater than a

threshold, the WNM sleep response frame comprises fourth information, the fourth information is used to indicate rejecting the sleep request of the station in a STA multi-link device.

26. The method according to claim 23 or 24, value “0” of the WNM sleep interval indicates that the one or more stations in the WNM sleep state in the STA multi-link device does not wake up at any specified interval.

27. The method according to any one of claims 23 to 26, the WNM sleep interval indicates an interval within which the one or more stations in the STA multi-link device receive a DTIM beacon frame, the interval is related to one or more DTIM beacon frame intervals at which the AP multi-link device sends a DTIM beacon frame on the one or more links, where each DTIM beacon frame interval is an interval at which an AP in the AP multi-link device sends a DTIM beacon frame on a link.

28. The method according to any one of claims 23 to 27, the WNM sleep request frame carries a WNM sleep mode element, and the WNM sleep mode element includes at least one of the following:

element ID, length, action type, WNM sleep mode response status, and the WNM sleep interval.

29. The method according to any one of claims 23 to 28, the WNM sleep interval is used to determine the lifetime of cache service of the STA multi-link device.

30. The method according to claim 29, the WNM sleep interval is used to determine an age function, wherein the age function is used to determine whether to discard the cache service of the STA multi-link device.

31. The method according to claim 27, the unit of the interval is a largest time interval in the one or more DTIM beacon frame intervals at which the AP multi-link device sends a DTIM beacon frame on the one or more links.

32. The method according to claim 31, the method further comprise:
receiving, by at least one station in the STA multi-link device, a DTIM beacon frame within the interval.

33. A communications method, comprising:
receiving, by an AP in an AP multi-link device, a WNM sleep request frame, from a station in a STA multi-link device, the WNM sleep request frame carries WNM sleep interval, the WNM

sleep interval is used to indicate a frequency at which one or more stations in the WNM sleep state in the STA multi-link device receive a beacon frame;

sending, by the AP in an AP multi-link device, a WNM sleep response frame, to the station in the STA multi-link device.

5 34. The method according to claim 33, the WNM sleep interval is applied to the one or more stations in the STA multi-link device.

35. The method according to claim 33 or 34, the WNM sleep interval is greater than a threshold, the WNM sleep response frame comprises fourth information, the fourth information is used to indicate rejecting the sleep request of the station in a STA multi-link device.

10 36. The method according to any one of claims 33 to 35, the WNM sleep interval indicates an interval within which the one or more stations in the STA multi-link device receive a DTIM beacon frame, the interval is related to one or more DTIM beacon frame intervals at which the AP multi-link device send a DTIM beacon frame on one or more links, where each DTIM beacon frame interval is an interval at which an AP in the AP multi-link device sends a DTIM beacon
15 frame on a link.

37. The method according to any one of claims 33 to 36, the WNM sleep request frame carries a WNM sleep mode element, and the WNM sleep mode element includes at least one of the following:

20 element ID, length, action type, WNM sleep mode response status, and the WNM sleep interval.

38. The method according to any one of claims 33 to 37, the AP multi-link device determines the lifetime of cache service of the STA multi-link device based on the WNM sleep interval.

39. The method according to claim 38, the AP multi-link device determines an age function based on the WNM sleep interval, and determines whether to discard the cache service of the STA
25 multi-link device based on the age function.

40. The method according to claim 36, the unit of the interval is a largest time interval in the one or more DTIM beacon frame intervals at which the AP multi-link device sends a DTIM beacon frame on the one or more links.

41. The method according to claim 40, the method further comprise:
30 sending, by at least one AP in the AP multi-link device, a DTIM beacon frame.

42. A communications apparatus, comprising:

a processing circuit and an interface circuit, the processing circuit is configured to control the interface circuit to perform a method as claimed in any one of claims 1-11, or a method as claimed in any one of claims 12-22, or a method as claimed in any one of claims 23-32, or a method as claimed in any one of claims 33-41.

43. A computer-readable recording medium on which a program is recorded, wherein the program, when executed, enables a computer to perform a method as claimed in any one of claims 1-11, or a method as claimed in any one of claims 12-22, or a method as claimed in any one of claims 23-32, or a method as claimed in any one of claims 33-41.

44. A communications apparatus, configured to perform a method as claimed in any one of claims 1-11, or a method as claimed in any one of claims 12-22, or a method as claimed in any one of claims 23-32, or a method as claimed in any one of claims 33-41.

45. A program product, comprising instructions which makes a computer to perform a method as claimed in any one of claims 1-11, or a method as claimed in any one of claims 12-22, or a method as claimed in any one of claims 23-32, or a method as claimed in any one of claims 33-41.