

CLAIMS

What is claimed is:

1. ~~A multi-band communication method, wherein the method comprises:~~

~~in a process in which an access point AP device authenticates a station STA device, sending,~~

5 ~~by the AP device, a target packet to the STA device, wherein the AP device comprises a plurality of APs, and the plurality of APs work on different frequency bands; and~~

~~the target packet comprises a plurality of multi-band elements, the plurality of multi-band elements one-to-one corresponding to the plurality of APs, each of the plurality of multi-band elements comprises frequency band information of a corresponding AP, and the plurality of multi-~~
10 ~~band elements indicate the STA device to perform association and key derivation with the plurality of APs.~~

~~2. The method according to claim 1, wherein the target packet is an association response frame generated in an association process, and/or the target packet is a key message generated in a key derivation process.~~

15 ~~3. The method according to claim 2, wherein when the target packet is the key message generated in the key derivation process, the target packet further comprises a robust security network information element, the robust security network information element comprises a request type, and the request type comprises a single link association type and a corresponding key derivation type, or the request type comprises a multi link association type and a corresponding~~
20 ~~key derivation type.~~

~~4. The method according to any one of claims 1 to 3, wherein the STA device comprises a plurality of STAs, the plurality of STAs work on different frequency bands, the plurality of STAs have different media access control MAC addresses, the plurality of STAs correspond to a first service access point SAP, and the plurality of APs correspond to a second service access point SAP;~~

25 ~~an association request frame sent by the STA device to the AP device comprises a first information element, wherein the first information element comprises a MAC address of the first SAP; or an address field in a frame header of an association request frame sent by the STA device to the AP device comprises a MAC address of the first SAP, wherein the MAC address of the first SAP is used to generate a key in the key derivation process; and~~

30 ~~an association response frame sent by the AP device to the STA device comprises a second~~

information element, wherein the second information element comprises a MAC address of the second SAP; or an address field in a frame header of an association response frame sent by the AP device to the STA device comprises a MAC address of the second SAP, wherein the MAC address of the second SAP is used to generate a key in the key derivation process.

5 5. The method according to claim 4, wherein the first information element further comprises indication information indicating an encryption algorithm preferentially used by the STA device, and/or the first information element further comprises a MAC address of each of the plurality of STAs; and

10 the second information element further comprises indication information used to indicate an encryption algorithm preferentially used by the AP device, and/or the second information element further comprises a MAC address of each of the plurality of APs.

15 6. The method according to any one of claims 1 to 3, wherein an association request frame sent by the STA device to the AP device comprises a third information element, the third information element comprises multi-AP association indication information, and the multi-AP association indication information is used to request to simultaneously perform association and key derivation with the plurality of APs; and

20 an association response frame sent by the AP device to the STA device comprises a second information element, the second information element comprises a MAC address of a second SAP; or an address field in a frame header of an association response frame sent by the AP device to the STA device comprises a MAC address of a second SAP, wherein the MAC address of the second SAP is used to generate a key in the key derivation process.

25 7. The method according to any one of claims 1 to 6, wherein a beacon frame sent by each of the plurality of APs comprises an access control policy information element, and the access control policy information element comprises at least one of a quantity of the plurality of APs, an access policy of each of the plurality of APs, switching threshold indication information, or STA association restriction, wherein

30 the switching threshold indication information indicates the STA device to perform AP switching when signal quality decreases to a first threshold, and the STA association restriction indicates a type of a STA that is allowed to be associated with each of the plurality of APs.

8. The method according to claim 7, wherein for any one of the plurality of APs, an access policy of the AP comprises at least one of a service policy or timeout information, wherein

the service policy indicates a highest access category AC or a traffic identifier TID of a data packet that is allowed by the AP to transmit, and the timeout information indicates the STA device to perform AP switching when the STA device does not receive, within preset duration, a data packet that is of a highest AC or a TID and that is allowed by the AP to transmit.

9. A multi-band communication method, wherein the method comprises:

in a process in which two multi-link ML devices perform fast session transition FST, sending, by one ML device, an FST frame to the other ML device, wherein the FST frame comprises a multi-band element, wherein

the multi-band element comprises a packet-level multi-link aggregation supported packet-level MLA-supported field, and the packet-level MLA-supported field indicates whether packet-level multi-link aggregation is supported.

10. The method according to claim 9, wherein one of the two ML devices is a station STA device, and the other ML device is an access point AP device; and

the multi-band element in the FST frame sent by the STA device to the AP device comprises a non-collocated supported (non-collocated supported) field, and the non-collocated supported field indicates whether non-collocated multi-link aggregation is supported.

11. The method according to claim 9 or 10, wherein one of the two ML devices is the STA device, and the other ML device is the AP device; and

the multi-band element in the FST frame sent by the AP device to the STA device comprises a multi-band connection capability field, the multi-band connection capability field comprises a non-collocated access point non-collocated AP indication bit, and the non-collocated AP indication bit indicates whether multi-link aggregation with an AP that belongs to another physical device is supported.

12. The method according to claim 9, wherein one of the two ML devices is a STA device, and the other ML device is an AP device, and the FST frame sent by the STA device to the AP device comprises a mobility domain element, wherein

the mobility domain element comprises a non-collocated supported field, and the non-collocated supported field indicates whether non-collocated multi-link aggregation is supported; or the mobility domain element comprises a non-collocated flow-level multi-link aggregation supported non-collocated flow-level MLA-supported field and a non-collocated packet-level multi-link aggregation supported non-collocated packet-level MLA-supported field, the non-collocated

~~flow-level MLA supported field indicates whether non-collocated multi-link aggregation is supported when flow-level multi-link aggregation is performed, and the non-collocated packet-level MLA supported field indicates whether non-collocated multi-link aggregation is supported when packet-level multi-link aggregation is performed.~~

5 ~~13. The method according to any one of claims 9 to 12, wherein the multi-band element further comprises a first flag bit, the first flag bit indicates whether the multi-band element comprises a link identity field, and the link identity field indicates a frequency band to which the two ML devices need to transfer an FST session.~~

10 ~~14. The method according to any one of claims 9 to 12, wherein the multi-band element further comprises a second flag bit, the second flag bit indicates whether the multi-band element comprises a multi-band control field, and the multi-band control field comprises the packet-level MLA supported field.~~

15 ~~15. A multi-band communication method, wherein the method comprises:
in a process in which two multi-link ML devices perform packet-level (packet-level) multi-link aggregation, communicating, by the two ML devices, with each other by using media access control MAC addresses of their respective service access points SAPs, and an SAP of each ML device corresponds to a plurality of network interfaces comprised in each ML device.~~

20 ~~16. The method according to claim 15, wherein in a communication process of the two ML devices, an address field of a data frame sent by one of the two ML devices to the other ML device comprises a MAC address of an SAP of the other ML device.~~

25 ~~17. The method according to claim 15 or 16, wherein
in the communication process of the two ML devices, an address field of a control frame sent by one of the two ML devices to the other ML device comprises the MAC address of the SAP of the other ML device or a MAC address of one network interface of the other ML device, and an address field of a management frame sent by the ML device to the other ML device comprises the MAC address of the SAP of the other ML device or the MAC address of the one network interface of the other ML device; or~~

30 ~~in the communication process of the two ML devices, address fields in a control frame and a management frame that are sent by one of the two ML devices to the other ML device both comprise a MAC address of one network interface of the other ML device; or~~

~~in the communication process of the two ML devices, an address field of a specified control~~

frame sent by one of the two ML devices to the other ML device comprises the MAC address of the SAP of the other ML device, and an address field in a management frame sent by the ML device to the other ML device and an address field in a control frame other than the specified control frame both comprise a MAC address of one network interface of the other ML device.

18. The method according to any one of claims 15 to 17, wherein in the communication process of the two ML devices, a frame header of the control frame sent by one of the two ML devices to the other ML device comprises an aggregation control field, and the aggregation control field comprises a multi-link entity identifier and control information.

19. The method according to any one of claims 15 to 18, wherein in the communication process of the two ML devices, an action frame sent by one of the two ML devices to the other ML device comprises a category field, and a value of the category field is the same as a value of a category field comprised in a fast session transition FST frame.

20. The method according to claim 19, wherein when the action frame is a multi-link aggregation setup request frame or a multi-link aggregation setup response frame, the action frame comprises a fourth information element, and the fourth information element indicates multi-link entity information.

21. The method according to claim 20, wherein the fourth information element comprises at least one of a collocated field, a multi-link aggregation initiator MAC address field, a multi-link aggregation responder MAC address field, a multi-link entity identifier field, a home link information field, or a component link information list field, and the component link information list field indicates information about each component link.

221. An interface parameter update method, comprising:

updating, by a multi-link₁ ML₁ device based on a status change of each of a plurality of network interfaces comprised in the ML device, parameters of enabled network interfaces in the plurality of network interfaces, wherein the parameters comprise at least one of capability information or an operation parameter, the plurality of network interfaces work on different frequency bands, and the plurality of network interfaces share antennas configured in the ML device.

232. The method according to claim 221, wherein the updating, by a multi-link ML device based on a status change of each of a plurality of network interfaces comprised in the multi-link ML device, parameters of enabled network interfaces in the plurality of network interfaces

comprises:

after enabling or disabling one of the plurality of network interfaces, configuring, by the ML device, parameters of each of all the enabled network interfaces in the plurality of network interfaces, and sending the parameters of all the enabled network interfaces through each of the enabled network interfaces.

~~243.~~ The method according to claim ~~22 or 23~~1 or 2, wherein the parameters comprise at least one of a configured quantity of transmit and receive antennas, a maximum supported quantity of to-be-sent or to-be-received streams, a parameter that indicates whether simultaneous sending and receiving with another network interface is supported, a highest modulation and coding scheme that is allowed to be used by devices at two ends of a link when adjacent channel interference exists on the link, a security margin that needs to be reserved at a transmit end of the link, channel bandwidth, or transmit power.

~~25. An access point AP device, wherein the AP device comprises a module configured to implement the method according to any one of claims 1 to 8.~~

~~264.~~ A multi-link₁ ML₁ device, wherein the ML device comprises a module configured to implement the method according to any one of claims ~~9-1~~1 to ~~243~~.

~~27. An access point AP device, wherein the AP device comprises a memory and a processor, the memory stores a program used to perform the method according to any one of claims 1 to 8, and the processor invokes the program stored in the memory to perform the method according to any one of claims 1 to 8.~~

~~285.~~ A multi-link₁ ML₁ device, wherein the ML device comprises a memory and a processor, the memory stores a program used to perform the method according to any one of claims ~~9-1~~1 to ~~243~~, and the processor invokes the program stored in the memory to perform the method according to any one of claims ~~9-1~~1 to ~~243~~.

~~296.~~ A computer-readable storage medium, wherein the computer-readable storage medium stores instructions; and when the instructions are run on a computer, the computer is enabled to perform the method according to any one of claims 1 to ~~243~~.

~~307.~~ A computer program product comprising instructions, wherein when the computer program product runs on a computer, the computer is enabled to perform the method according to any one of claims 1 to ~~243~~.

~~318.~~ A chip, wherein the chip comprises a processing circuit and an interface circuit, the

interface circuit is configured to receive instructions and transmit the instructions to the processing circuit, and the processing circuit is configured to perform the method according to any one of claims 1 to 243.