

CLAIMS

What is claimed is:

- 5 1. A method of controlling data transmission in a wireless mesh network, the wireless mesh network comprising a plurality of nodes capable of transmitting and receiving data packets, the method comprising:
 - providing a frame comprising a plurality of time slots for data transmission;
 - 10 classifying the plurality of time slots into a plurality of sets of time slots, the plurality of sets of time slots having a number of sets of time slots, the number of sets of time slots being determined based on an interference range of the plurality of nodes, such that the plurality of time slots are classified into the plurality of sets of time slots for a plurality of groups of

15 nodes of the plurality of nodes, respectively, and nodes in the plurality of nodes having respective hop counts associated therewith which are different but satisfy a predefined relationship based on the number of sets of time slots belong to a same group of the plurality of groups of nodes and are able to transmit data packets at a same set of time slots of the plurality of time slots,

20 for avoiding multi-hop interference in data transmission in the frame amongst the plurality of nodes; and

 determining, at a node of the plurality of nodes, a set of time slots amongst the plurality of sets of time slots for the node to transmit data packets, the set of time slots being determined based on a hop count associated with the

25 node.
2. The method according to claim 1, wherein the number of sets of time slots is determined based on the number of hops, from a node to one or more other nodes in the plurality of nodes, being within the interference range.
- 30 3. The method according to claim 2, wherein the number of sets of time slots is determined to be equal to or greater than said number of hops plus two.

4. The method according to claim 1, wherein the determined set of time slots is determined amongst the plurality of sets of time slots based on the hop count associated with the node and the number of sets of time slots.
- 5 5. The method according to claim 4, wherein the determined set of time slots is determined amongst the plurality of sets of time slots based on a value obtained from the hop count associated with the node modulo the number of sets of time slots.
- 10 6. The method according to claim 5, wherein the plurality of sets of time slots is located separate from each other and in time order in the frame, and the determined set of time slots has a time order associated therewith in the frame satisfying a predefined relationship to said value obtained.
- 15 7. The method according to claim 1, wherein the node is scheduled based on the frame to transmit data packets in the determined set of time slots, and the node is configured to randomly select a time slot in the determined set of time slots for transmitting the data packets.
- 20 8. The method according to claim 7, wherein the node is further configured to perform a delay for a random time period from a start of the selected time slot prior to transmitting the data packets.
- 25 9. The method according to claim 7, wherein the node is configured to transmit data packets at the selected time slot based on a Carrier Sense Multiple Access (CSMA) protocol.
- 30 10. The method according to claim 1, wherein one of the plurality of nodes is a base node, and the hop count of the node is determined based on the number of hops between the base node and the node.
11. The method according to claim 9, wherein the frame further comprises one or more additional time slots reserved for CSMA back-off and auto-

retransmission located adjacent an end of each of the plurality of sets of time slots.

12. A node in a wireless mesh network comprising a plurality of nodes capable of transmitting and receiving data packets, the node comprising:

 - a frame module configured to provide a frame comprising a plurality of time slots for data transmission;
 - a classification module configured to classify the plurality of time slots into a plurality of sets of time slots, the plurality of sets of time slots having a number of sets of time slots, the number of sets of time slots being determined based on an interference range of the plurality of nodes, such that the plurality of time slots are classified into the plurality of sets of time slots for a plurality of groups of nodes of the plurality of nodes, respectively, and nodes in the plurality of nodes having respective hop counts associated therewith which are different but satisfy a predefined relationship based on the number of sets of time slots belong to a same group of the plurality of groups of nodes and are able to transmit data packets at a same set of time slots of the plurality of time slots, for avoiding multi-hop interference in data transmission in the frame amongst the plurality of nodes; and
 - a time slot determination module configured to determine a set of time slots amongst the plurality of sets of time slots for the node to transmit data packets, the set of time slots being determined based on a hop count associated with the node.
13. The node according to claim 12, wherein the number of sets of time slots is determined based on the number of hops, from a node to one or more other nodes in the plurality of nodes, being within the interference range.
14. The node according to claim 13, wherein the determined set of time slots is determined amongst the plurality of sets of time slots based on the hop count associated with the node and the number of sets of time slots.
15. The node according to claim 12, wherein the node is scheduled based on the frame to transmit data packets in the determined set of time slots, and the time

slot determination module is further configured to randomly select a time slot in the determined set of time slot for transmitting the data packets.

16. The node according to claim 15, configured to transmit data packets at the
5 selected time slot based on a Carrier Sense Multiple Access (CSMA) protocol.

17. The node to claim 12, wherein one of the plurality of nodes is a base node, and the hop count of the node is determined based on the number of hops between the base node and the node.

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18. A computer program product, embodied in one or more non-transitory computer-readable storage mediums, comprising instructions executable by one or more computer processors to perform a method of controlling data transmission in a wireless mesh network, the wireless mesh network comprising a plurality of nodes capable of transmitting and receiving data
15 packets, the method comprising:

providing a frame comprising a plurality of time slots for data transmission;

20 classifying the plurality of time slots into a plurality of sets of time slots, the plurality of sets of time slots having a number of sets of time slots, the number of sets of time slots being determined based on an interference range of the plurality of nodes, such that the plurality of time slots are classified into the plurality of sets of time slots for a plurality of groups of nodes of the plurality of nodes, respectively, and nodes in the plurality of
25 nodes having respective hop counts associated therewith which are different but satisfy a predefined relationship based on the number of sets of time slots belong to a same group of the plurality of groups of nodes and are able to transmit data packets at a same set of time slots of the plurality of time slots, for avoiding multi-hop interference in data transmission in the frame amongst
30 the plurality of nodes; and

determining, at a node of the plurality of nodes, a set of time slots amongst the plurality of sets of time slots for the node to transmit data packets, the set of time slots being determined based on a hop count associated with the node.