CLAIMS

1. A method for use in a Dynamic Spectrum Manager, DSM, for coordinating asynchronous silent periods in a network, the method comprising:

detecting a primary user in the network, the detection triggering scheduling of an asynchronous silent period, in addition to any periodic silent periods, by:

transmitting a Silent Period Start Control Message to one or more cognitive radio, CR, nodes in the network, wherein the message indicates the start and duration of a silent period and initiates spectrum sensing;

receiving a Measurement Report Control Message from the one or more CR nodes in the network indicating results of spectrum sensing; and

transmitting a message to the one or more CR nodes, wherein the message instructs the one or more CR nodes to move to a different frequency based on the spectrum sensing results.

2. The method of claim 1 wherein the DSM is located in an access point, AP.

3. The method of claim 1 wherein the DSM is located in a Home enhanced-Node B, H(e)NB.

4. The method of claim 1 wherein the detecting a primary user in the network is based on a channel quality indicator, CQI, measurement.

5. The method of claim 4 wherein the CQI measurement is a measured channel quality of a link between two CR nodes.

6. A method for use in one or more Cognitive

Radio, CR, nodes for coordinating asynchronous silent periods, the method comprising:

detecting an arrival of a primary user;

following the detection of a primary user, monitoring a time-to-trigger, TTT, to determine if a channel quality is below a predetermined threshold;

on a condition that the TTT is above a predetermined threshold, transmitting a Silent Period Trigger Control Message;

continuing transmit/receive operations after the Silent Period Trigger Control Message is transmitted;

receiving a Silent Period Start Control Message, wherein the message indicates the start and duration of a silent period and initiates spectrum sensing;

interrupting an ongoing transmission after the Silent Period Start Control Message is received;

transmitting a Measurement Report Control Message indicating results of spectrum sensing; and

receiving a message from a Dynamic Spectrum Manager, DSM, wherein the message instructs the one or more CR nodes to move to a different frequency based on the spectrum sensing results.

7. The method of claim 6 wherein the Silent Period Trigger Control Message is transmitted in response to detecting an arrival of a primary user by the CR node.

8. The method of claim 7 wherein the arrival of a primary user is detected by the CR node through a local change in channel quality, link throughput, or number of retransmission associated with an active link.

9. The method of claim 6 wherein the spectrum sensing is extended for a period of time on a condition that the results of the spectrum sensing fail to detect a primary user.

10. The method of claim 1, wherein the detecting a primary user in the network is achieved by receiving a Silent Period Trigger Control message.

11. The method of claim 1, wherein the detecting a primary user in the network is based on a channel quality being below a certain amount for a minimum amount of time.

12. The method of claim 6, further comprising:

continuing normal transmit/receive operations until receiving a Silent Period Start Control Message; and

interrupting, during the silent period, any ongoing transmission by the CR node.

CLAIMS

1. A method for use in a Dynamic Spectrum Manager, DSM, for coordinating asynchronous silent periods in a network, the method comprising:

detecting a primary user in the network, the detection triggering scheduling of an asynchronous silent period, in addition to any periodic silent periods, by:

transmitting a Silent Period Start Control Message to one or more cognitive radio, CR, nodes in the network, wherein the message indicates the start and duration of a silent period and initiates spectrum sensing;

receiving a Measurement Report Control Message from the one or more CR nodes in the network indicating results of spectrum sensing; and

transmitting a message to the one or more CR nodes, wherein the message instructs the one or more CR nodes to move to a different frequency based on the spectrum sensing results.

2. The method of claim 1 wherein the DSM is located in an access point, AP.

3. The method of claim 4 wherein the DSM is located in a Home enhanced-Node B, H(e)NB.

4. The method of claim 1 wherein the detecting a primary user in the network is based on a channel quality indicator, CQI, measurement.

5. The method of claim 4 wherein the CQI measurement is a measured channel quality of a link between two CR nodes.

6. The method of claim 1, wherein the detecting a primary user in the network is achieved by receiving a Silent Period Trigger Control message.

7. The method of claim 1, wherein the detecting a primary user in the network is based on a channel quality being below a certain amount for a minimum amount of time.

8. A method for use in one or more Cognitive Radio, CR, nodes for coordinating asynchronous silent periods, the method comprising:

detecting an arrival of a primary user;

following the detection of a primary user, monitoring a time-to-trigger, TTT, to determine if a channel quality is below a predetermined threshold;

on a condition that the TTT is above a predetermined threshold, transmitting a Silent Period Trigger Control Message;

continuing transmit/receive operations after the Silent Period Trigger Control Message is transmitted;

receiving a Silent Period Start Control Message, wherein the message indicates the start and duration of a silent period and initiates spectrum sensing;

interrupting an ongoing transmission after the Silent Period Start Control Message is received;

transmitting a Measurement Report Control Message indicating results of spectrum sensing; and

receiving a message from a Dynamic Spectrum Manager, DSM, wherein the message instructs the one or more CR nodes to move to a different frequency based on the spectrum sensing results.

9. The method of claim 8 wherein the Silent Period Trigger Control Message is transmitted in response to detecting an arrival of a primary user by the CR node.

10. The method of claim 9 wherein the arrival of a primary user is detected by the CR node through a local change in channel quality, link throughput, or number of retransmission associated with an active link.

11. The method of claim 8 wherein the spectrum sensing is extended for a period of time on a condition that the results of the spectrum sensing fail to detect a primary user.

12. The method of claim 8, further comprising:

continuing normal transmit/receive operations until receiving a Silent Period Start Control Message; and

interrupting, during the silent period, any ongoing transmission by the CR node.