

CLAIMS

WHAT IS CLAIMED IS:

1. A method of broadcasting consumption data from a network device, the method comprising:

determining a particular data channel, from a plurality of data channels, for broadcasting consumption data, the consumption data associated with consumption of at least one of electricity, water, or gas;

determining modulation techniques that are commonly available to a plurality of nodes located within a predetermined proximity to the network device, the plurality of nodes belonging to a heterogeneous network of nodes capable of communicating with the network device but having differing sets of modulation techniques available to use;

determining a modulation technique of the determined commonly available modulation techniques to utilize for broadcasting the consumption data, the determined modulation technique providing a longest communication range from among the determined commonly available modulation techniques;

broadcasting a prepare-to-broadcast message via a control channel, the prepare-to-broadcast message indicating that the consumption data will be broadcast on the particular data channel and using the determined modulation technique;

switching to the particular data channel;

broadcasting the consumption data via the particular data channel and the determined modulation technique without having received a communication from a neighboring node that indicates an availability of the neighboring node to receive the consumption data; and

switching to the control channel after the consumption data has been broadcast.

2. The method of claim 1, wherein:

the broadcasting the consumption data includes broadcasting the consumption data to the plurality of nodes; and

the switching to the control channel includes switching to the control channel without receiving an acknowledgement message from any of the plurality of nodes.

3. The method of claim 1, wherein the particular data channel is determined by a media access control layer.

4. The method of claim 1, wherein:

the control channel is located on a first channel of a multi-channel network when the prepare-to-broadcast message is broadcast via the control channel; and

the method further comprises:

frequency hopping the control channel from the first channel to a second channel of the multi-channel network; and

rebroadcasting the prepare-to-broadcast message via the control channel which is located on the second channel.

5. One or more non-transitory computer-readable media storing executable instructions that, when executed by one or more processors of a network device, cause the one or more processors to:

determine a particular data channel, from a plurality of data channels, for broadcasting consumption data, the consumption data associated with consumption of at least one of electricity, water, or gas;

determine modulation techniques that are commonly available to a plurality of nodes located within a predetermined proximity to the network device, the plurality of nodes belonging to a heterogeneous network of nodes capable of communicating with the network device but having differing sets of modulation techniques available to use;

determine a modulation technique of the determined commonly available modulation techniques to utilize for broadcasting the consumption data, the determined modulation technique providing a longest communication range from among the determined commonly available modulation techniques;

broadcast a prepare-to-broadcast message via a control channel, the prepare-to-broadcast message indicating that the consumption data will be broadcast on the particular data channel and using the determined modulation technique;

switch to the particular data channel;

broadcast the consumption data via the particular data channel and the determined modulation technique without having received a communication from a neighboring node that indicates an availability of the neighboring node to receive the consumption data; and

switch to the control channel after the consumption data has been broadcast.

6. A method comprising:

receiving a message from a neighboring node via a control channel, the message indicating that consumption data will be broadcast via a particular data channel of a plurality of data channels and via a modulation technique determined by the neighboring node, wherein the determined modulation technique is one of a plurality of modulation techniques that are determined to be commonly available to a plurality

of nodes located within a predetermined proximity to the neighboring node, the plurality of nodes belonging to a heterogeneous network of nodes capable of communicating with the neighboring node but having differing sets of modulation techniques available to use, wherein the determined modulation technique is further determined to provide a longest communication range from among the determined commonly available modulation techniques, and wherein the consumption data is associated with consumption of at least one of electricity, water, or gas;

without sending a communication to the neighboring node indicating an availability to receive the consumption data:

switching to the particular data channel; and

listening for a broadcast of the consumption data from the neighboring node via the particular data channel; and

switching to the control channel after the consumption data has been received or a predetermined time period has expired.

7. The method of claim 6, wherein the listening for the broadcast of the consumption data includes listening for a broadcast of the consumption data after a predetermined time interval has expired since the message was received via the control channel, the predetermined time interval comprising a short inter-frame space.

8. The method of claim 6, further comprising:

determining that the consumption data has not been previously received;

wherein the switching to the particular data channel is performed in response to determining that the consumption data has not been previously received.

9. The method of claim 6, further comprising:

receiving the consumption data via the particular data channel after switching to the particular data channel;

wherein the switching to the control channel includes switching to the control channel after receiving the consumption data via the particular data channel.

10. The method of claim 6, wherein the message indicates a data rate at which the consumption data will be broadcast.

11. The method of claim 6, wherein the consumption data includes a greater number of bits or bytes than the message.

12. One or more non-transitory computer-readable media storing executable instructions that, when executed by one or more processors, cause the one or more processors to:

- receive a message from a neighboring node via a control channel, the message indicating that consumption data will be broadcast via a particular data channel of a plurality of data channels and via a modulation technique determined by the neighboring node, wherein the determined modulation technique is one of a plurality of modulation techniques that are determined to be commonly available to a plurality of nodes located within a predetermined proximity to the neighboring node, the plurality of nodes belonging to a heterogeneous network of nodes capable of communicating with the neighboring node but having differing sets of modulation techniques available to use, wherein the determined modulation technique is further determined to provide a longest communication range from among the determined commonly available modulation techniques, and wherein the consumption data is associated with consumption of at least one of electricity, water, or gas;

- without sending a communication to the neighboring node indicating an availability to receive the consumption data:

- switch to the particular data channel; and

- listen for a broadcast of the consumption data from the neighboring node via the particular data channel; and

- switch to the control channel after the consumption data has been received or a predetermined time period has expired.

13. A network computing device comprising:

- one or more processors;

- memory communicatively coupled to the one or more processors; and

- one or more modules stored in the memory and executable by the one or more processors to perform acts including:

- identifying a particular data channel from a plurality of data channels for broadcasting consumption data, the consumption data associated with consumption of at least one of electricity, water, or gas;

- determining modulation techniques that are commonly available to a plurality of nodes located within a predetermined proximity to the network computing device, the plurality of nodes belonging to a heterogeneous network of nodes capable of communicating with the network computing device but having differing sets of modulation techniques available to use;

determining a modulation technique of the determined commonly available modulation techniques to utilize for broadcasting the consumption data, the determined modulation technique providing a longest communication range from among the determined commonly available modulation techniques;

transmitting a message indicating that the consumption data will be broadcast via the particular data channel of the plurality of data channels and the determined modulation technique; and

broadcasting the consumption data via the particular data channel and the determined modulation technique without having received a communication from a neighboring node that indicates an availability of the neighboring node to receive the consumption data.

14. The network computing device of claim 13, wherein the acts further include:

confirming that a number of bits or bytes of the consumption data is greater than a number of bits or bytes of the message;

wherein the message is transmitted in response to confirming that the number of bits or bytes of the consumption data is greater than the number of bits or bytes of the message.

15. The network computing device of claim 13, wherein the communication from the neighboring node comprises a clear-to-send message.

16. The network computing device of claim 13, wherein the acts further include:

retransmitting the message via the control channel a predetermined number of times; and

rebroadcasting the consumption data via the particular data channel after each retransmission of the message.

17. The network computing device of claim 13, wherein the acts further include:

redefining the control channel from a first channel, where the control channel is located when broadcasting the consumption data, to a second channel; and

retransmitting the message via the control channel when the control channel is redefined to the second channel.

18. The network computing device of claim 13, further comprising:

a metrology module stored in the memory and executable by the one or more processors to collect the consumption data for broadcasting.

19. The network computing device of claim 13, wherein the network computing device comprises at least one of a utility meter, a control device, a sensor, a transformer, a router, a server, a relay, a switch, or a valve.

20. The network computing device of claim 13, wherein the determining the modulation technique includes determining the modulation technique that requires less communication time from among the plurality of modulation techniques that are commonly available to the plurality of nodes located within the predetermined proximity to the network computing device.