

## CLAIMS

1. A method for improving communications among battery operated network endpoints and a central facility, comprising:

transmitting a signal from an endpoint having water or gas metering functionality and that is in a group of endpoints selected to share a repeater load of messages from other endpoints also having water or gas metering functionality, wherein the signal is configured to indicate availability of repeater functionality thereat sufficient to support repeating messages from at least one of the other endpoints, and wherein the selected endpoints are selected based at least in part on proximity to an endpoint that is out-of-range of a central facility and based at least in part on battery capacity of the selected group of endpoints being sufficient to repeat messages from the other endpoints;

receiving messages from at least one endpoint to which the signal was transmitted that requires repeater functionality to be heard at the central facility; and

relaying the received messages from the endpoint requiring repeater functionality, wherein the relaying is performed by the selected group of endpoints in a shared manner.

2. A method as in claim 1, wherein the sufficient battery capacity comprises such battery capacity being above a predetermined level.

3. A method as in claim 1, wherein transmitting the signal is based at least in part on the endpoint having a sufficient quality of service connection to another endpoint or the central facility.

4. A method as in claim 1, wherein transmitting the signal is based on reliability of a communication path from the endpoint to the central facility.

5. A method as in claim 1, wherein transmitting the signal comprises transmitting a packet header having a discovery bit, wherein the discovery bit indicates to the other endpoints that the endpoint has enough battery capacity to receive messages and to forward the messages.

6. A method as in claim 1, further comprising:  
transmitting measurement data to the central facility.

7. A method as in claim 6, wherein the measurement data describes at least one of water, gas, or oil consumption.

8. A network, comprising:

a central facility; and

a plurality of endpoints having water or gas metering functionality, selected of the plurality of endpoints being battery powered and having capability to operate as repeaters, wherein the selected endpoints are selected based at least in part on proximity to an endpoint that is out-of-range of the central facility and based at least in part on battery capacity of the selected endpoints being sufficient to repeat messages sent from other endpoints;

wherein the selected endpoints share a repeater load and perform functions comprising:

transmitting signals from the selected endpoints, the signals configured with preambles having a discovery bit to indicate to the out-of-range endpoint availability of repeater functionality thereat sufficient to support repeating messages from other endpoints;

receiving messages at the selected endpoints from the other endpoints that require repeater functionality to be heard at the central facility; and

relaying the received messages, wherein the relaying is performed by the selected endpoints in a shared manner.

9. A network as in claim 8, wherein the signals are provided based on the selected endpoints having a sufficient quality of service connection to the central facility.

10. A network as in claim 8 wherein the signals are provided based at least in part on reliability of a communication path to the central facility.

11. A network as in claim 8, wherein the selected endpoints are selected based at least in part on reliability of a communication path from the respective endpoint to the central facility.

12. A network as in claim 8, further comprising:  
a measurement device associated with each of the plurality of endpoints.

13. A network as in claim 12, wherein said measurement device comprises a water, gas, or oil meter.

14. A method, comprising:  
collecting measurement data at an endpoint in a network of battery operated endpoints having water or gas metering functionality;

evaluating transmission conditions of the endpoint in the network;

transmitting, from an endpoint in a group of endpoints selected to share a repeater load from other endpoints in the network, packets with a preamble configured with a discovery bit to indicate to the other endpoints in the network availability of repeater functionality usable by the other endpoints, wherein the group of selected endpoints are selected based at least in part on proximity to an endpoint that is out-of-range of a central facility and based at least in part on battery capacity of the selected endpoints being sufficient to repeat messages from the other endpoints;

receiving messages from at least one endpoint at which the discovery bit was received that is out-of-range of the central facility and that requires repeater functionality to be heard at the central facility; and

relaying the received messages, wherein the relaying is performed by the selected group in a shared manner.

15. A method as in claim 14, wherein the evaluating comprises evaluating links of the endpoint in the network to other endpoints upstream in the network.

16. A method as in claim 14, wherein the evaluating includes determining battery capacity of the endpoint in the network.

17. A method as in claim 14, wherein:

the evaluating includes evaluating upstream links of the endpoint in the network and determining if battery capacity of the endpoint in the network is sufficient to share the repeater load.

18. A network as in claim 8, wherein the shared manner distributes workload over at least two endpoints to prevent any single endpoint from performing all of the relaying required by the out-of-range endpoint.

19. A method as in claim 14, wherein the discovery bit indicates availability of sufficient battery power to perform the relaying and availability of a reliable communication path to perform the relaying.

20. A method as in claim 1, wherein the shared manner distributes workload over at least two endpoints to prevent any single endpoint from performing the entire relaying required by the out-of-range endpoint.

**WHAT IS CLAIMED IS:**

1. A method for improving communications among battery operated network endpoints and a central facility, comprising:  
transmitting a signal from endpoints to indicate availability of repeater functionality thereat sufficient to support repeating messages from other endpoints;  
5 and  
relaying messages from endpoints requiring repeater functionality to be heard at the central facility.
2. A method as in claim 1, wherein transmitting a signal is permitted based on the battery capacity of an endpoint being sufficient to support repeating messages from other endpoints.
3. A method as in claim 2, wherein said sufficient battery capacity comprises such battery capacity being above a predetermined level.
4. A method as in claim 3, wherein transmitting a signal is further permitted based on the endpoint having a sufficient quality of service connection to at least another upstream endpoint or directly to a central facility.
5. A method as in claim 1, wherein transmitting a signal is permitted based on the reliability of the endpoint's communication path to the central facility.
6. A method as in claim 5, wherein transmitting a signal is further permitted based on the battery capacity of an endpoint being sufficient to support repeating messages from other endpoints.
7. A method as in claim 1, wherein transmitting a signal comprises transmitting a discovery bit.
8. A method as in claim 1, further comprising;

associating a measurement device with the endpoint, so that the endpoint may transmit measurement data to the central facility.

9. A method as in claim 8, wherein the measurement device corresponds to a consumption measurement device.

10. A method as in claim 9, wherein the consumption measurement device corresponds to at least one of a water, gas, and oil meter.

11. A method as in claim 1, including establishing a network of endpoints, at least some of which are configured to operate as repeaters.

12. A network, comprising:  
a central facility; and  
a plurality of endpoints, selected of said plurality of endpoints being battery powered and having capability to operate as a repeater;

5 wherein said endpoints having capability to operate as a repeater provide an indication of such capability to other endpoints only after determining that they have repeater functionality thereat sufficient to support repeating messages from other endpoints.

13. A network as in claim 12, wherein said indication is provided based on the battery capacity of an endpoint being sufficient to support repeating messages from other endpoints.

14. A network as in claim 13, wherein said sufficient battery capacity comprises such battery capacity being above a predetermined level.

15. A network as in claim 14, wherein said indication is further provided based on the endpoint having a sufficient quality of service connection to at least another upstream endpoint or directly to a central facility.

16. A network as in claim 12, wherein said indication is provided based on reliability of the endpoint's communication path to said central facility.

17. A network as in claim 16, wherein said indication is further provided based on the battery capacity of an endpoint being sufficient to support repeating messages from other endpoints.

18. A network as in claim 12, wherein said indication comprises a signal transmitted by said endpoints.

19. A network as in claim 12, wherein indicating capability to other endpoints to operate as a repeater is permitted based on reliability of the endpoint's communication path to the central facility.

20. A network as in claim 12, wherein endpoints having sufficient battery capacity to support repeating messages transmit a discovery bit.

21. A network as in claim 12, further comprising;  
a measurement device associated with at least selected of said plurality of endpoints,  
whereby the endpoint may transmit measurement data to the central facility.

22. A network as in claim 21, wherein said measurement device comprises a consumption measurement device.

23. A network as in claim 22, wherein said consumption measurement device corresponds to at least one of a water, gas, and oil meter.

24. A method for improving communications among battery operated network endpoints and a central facility, comprising:  
collecting measurement data at at least some of said endpoints;  
evaluating transmission conditions of an endpoint in such network;

5 transmitting to other of such endpoints in such network availability of an endpoint to provide repeater functionality to such other endpoints.

25. A method as in claim 24, wherein evaluating includes evaluating upstream links of an endpoint in such network.

26. A method as in claim 24, wherein evaluating includes determining battery capacity of an endpoint in such network.

27. A method as in claim 26, wherein determining battery capacity includes determining whether such battery capacity is above a predetermined level.

28. A method as in claim 24, including relaying messages from endpoints requiring repeater functionality to be heard at the central facility.

29. A method as in claim 24, wherein:  
evaluating includes evaluating upstream links of an endpoint in such network, and determining battery capacity of such endpoint; and  
said method includes relaying messages from endpoints requiring repeater  
5 functionality to be heard at the central facility.