CLAIMS

I claim:

1. A method for controlling the communication of data between an endpoint and a gateway, comprising the steps of:

initially assigning a default communication channel for the endpoint;

relaying at least one message from the endpoint to the gateway over the default communication channel;

determining communications performance by using at least one of signal-to-noise ratio and signal quality of the message received by the gateway;

selecting one of a plurality of communication channels for the endpoint based on the communications performance where by channels are associated with a level of performance, wherein the plurality of communication channels have modulation rates and message durations different from the default communication channel; and

assigning a selected communication channel to the endpoint such that the endpoint communicates to the gateway along with similar performing endpoints over the selected communication channel.

2. The method of claim 1 wherein the default communication channel has a default modulation rate and a default message duration.

~~3. The method of claim 2 wherein the selected communication channel includes a decreased message duration when the signal-to-noise ratio exceeds an upper threshold.~~

~~4. The method of claim 3 wherein the selected communication channel includes an increased message duration when the signal-to-noise ratio is below a lower threshold.~~

~~5~~3. The method of claim 1 wherein the communication channel is selected based on the signal-to-noise ratio to optimize the message duration.

~~6. The method of claim 1 wherein the plurality of communication channels have modulation rates and message durations different from the default communication channel.~~

~~7~~4. The method of claim 1 wherein the signal-to-noise ratio is averaged over a plurality of messages received during a pre-determined period.

~~8~~5. A method of controlling the communication of meter data from a meter to one of a plurality of gateways, comprising the steps of:

relaying a plurality of messages from the meter to one or more of the gateways;

determining the signal-to-noise ratio of the messages received by each of the plurality of gateways;

selecting one of a plurality of communication channels for the meter based on the highest signal-to-noise ratio for the messages received by the plurality of gateways; ~~and~~

assigning the selected communication channel to the meter~~.~~;

transmitting a plurality of messages from the meter to one or more of the gateways over the selected communication channel; and

determining the signal-to-noise ratio of the messages received by each of the plurality of gateways and selecting another one of the plurality of communication channels for the meter when the signal-to-noise ratio for the messages received by the plurality of gateways increases or decreases, wherein a new communication channel is selected when the signal-to-noise ratio for the current communication channel exceeds an upper threshold value or fails below a lower threshold value for the current communication channel.

~~9. The method of claim 8 further comprising the steps of:~~

~~transmitting a plurality of messages from the meter to one or more of the gateways over the selected communication channel; and~~

~~determining the signal-to-noise ratio of the messages received by each of the plurality of gateways and selecting another one of the plurality of communication channels for the meter when the signal-to-noise ratio for the messages received by the plurality of gateways increases or decreases.~~

~~10~~6. The method of claim ~~9~~ 5 wherein the selection of the communication channel is based on the signal-to-noise ratio to optimize the message duration.

~~11. The method of claim 9 wherein a new communication channel is selected when the signal-to-noise ratio for the current communication channel exceeds an upper threshold value or falls below a lower threshold value for the current communication channel.~~

~~12~~7. The method of claim ~~8~~ 5 wherein the communication channel is selected from a plurality of communication channels, wherein the communication channel is selected based on the signal-to-noise ratio to optimize the message duration.

~~13~~8. The method of claim ~~8~~ 5 wherein the plurality of communication channels have different modulation rates and message durations.

~~14~~9. The method of claim ~~8~~ 5 wherein the signal-to-noise ratio is averaged over a plurality of messages received during a pre-determined period.

~~15~~10. A method of selecting the communication protocol for each meter of a plurality of meters in a communication system including a plurality of gateways that each communicate to a back end server, the method comprising the steps of:

assigning a default communication channel to each of the plurality of meters, wherein the default communication channel is the same for all of the plurality of meters;

relaying a plurality of messages from each of the meters;

determining the signal-to-noise ratio of the messages received at each of the gateways for each of the plurality of meters;

selecting one of a plurality of communication channels for each of the meters based upon the highest signal-to-noise ratio at one of the gateways for the plurality of message sent by the plurality of meters wherein the plurality of channels have increasing transmission rates and decreasing message durations, wherein the communication channel is selected to maximize the transmission rate and minimize the message duration; and

assigning the selected communication channel to each of the plurality of meters.

~~16. The method of claim 15 wherein the default communication channel is the same for all of the plurality of meters.~~

~~17. The method of claim 16 wherein the plurality of channels have increasing transmission rates and decreasing message durations, wherein the communication channel is selected to maximize the transmission rate and minimize the message duration.~~

~~18~~11. The method of claim ~~15~~ 10 further comprising at least one intermediate meter operable to receive the messages transmitted by at least one of the meters and to relay the received

message to at least one of the gateways, wherein the intermediate meter communicates over the communication channel having the highest transmission rate and shortest message duration.

~~19~~12. The method of claim ~~15~~ 10 wherein the selected alternative communication channel is based upon the highest signal-to-noise ratio at one of the plurality of gateways for each of the plurality of meters.

~~20~~13. The method of claim 1 where tri-band operation is used such that the number of channels assigned is three where one channel is assigned only endpoints who's signal to noise ratio (SNR) to its best link margin gateway is low, and where one channel is assigned only endpoints who's SNR to its best link margin gateway is medium, and where one channel is assigned only endpoints who's SNR to its best link margin gateway is high.

~~21~~14. The method of claim ~~20~~ 13 where the low, mid and high SNR channels are assigned endpoint traffic in a manor to normalize the total on-time or duty cycle of traffic such that the traffic is evenly spread.

~~22~~15. The method of claim ~~20~~ 13 where the low, mid and high SNR channels are assigned endpoint traffic in a manor to normalize the total on-time or duty cycle of traffic such that the traffic is maximized into the high channel since more messages can be transacted per unit time