CLAIMS

1. A system comprising:

an antenna configured to receive a signal from a transmitting radio frequency unit, the signal including data and a preamble containing bits for a known sequence of a predetermined length; and

a modem configured to:

retrieve the preamble from the signal;

transform the preamble and the data from a time domain into a frequency domain, the transforming the preamble into the frequency domain causing generation of preamble-based frequency points in the frequency domain;

calculate averages of groups of neighboring frequency points in the frequency domain, the groups of neighboring frequency points being selected from the preamble-based frequency points in the frequency domain;

compare the calculated averages to an expected frequency response in the frequency domain, the expected frequency response being based on the known sequence of the predetermined length in the frequency domain, the comparison to be used to determine an effect of nonlinear noise in the signal;

determine a correction filter to apply to the data based on the comparison, the correction filter configured to reduce the effect of the nonlinear noise on the data;

apply the correction filter to the data in the frequency domain to create corrected data in the frequency domain;

transform the corrected data from the frequency domain back to the time domain; and

provide the corrected data for processing.

2. The system of claim 1, further comprising a second correction filter configured to adjust the signal to correct for known hardware imperfections of a receiver.

3. The system of claim 1, wherein the modem is further configured to identify and retrieve a cyclic prefix from the signal.

4. The system of claim 1, wherein at least some of the nonlinear noise is generated by components of the transmitting radio frequency unit.

5. The system of claim 1, wherein at least some of the nonlinear noise is generated by components of a receiving radio frequency unit.

6. The system of claim 1, wherein the correction filter is configured to apply an inverse between a difference of the calculated averages and the expected frequency response in the frequency domain to the data.

7. The system of claim 1, wherein the modem is further configured to select the correction filter from a plurality of preexisting correction filters based on the comparison of the calculated averages to the expected frequency response.

8. The system of claim 1, wherein the expected frequency response is generated by transforming a reference signal to the frequency domain, the reference signal comprising a same sequence of symbols as the known sequence, the reference signal having not been transmitted from the transmitting radio frequency unit to the antenna.

9. The system of claim 1, wherein the modem is a part of a microwave receiving radio frequency unit coupled to the antenna.

10. The system of claim 9, wherein the transmitting radio frequency unit transmits the signal to the microwave receiving radio frequency unit via line of sight propagation.

11. A method performed by a communication device, the method comprising:

receiving a signal from a transmitting radio frequency unit, the signal including data and a preamble containing bits for a known sequence of a predetermined length;

retrieving the preamble from the signal;

transforming the preamble and the data from a time domain into a frequency domain, the transforming the preamble into the frequency domain causing generation of preamble-based frequency points in the frequency domain;

calculating averages of groups of neighboring frequency points in the frequency domain, the groups of neighboring frequency points being selected from the preamble-based frequency points in the frequency domain;

comparing the calculated averages to an expected frequency response in the frequency domain, the expected frequency response being based on the known sequence of the predetermined length in the frequency domain, the comparison to be used to determine an effect of nonlinear noise in the signal;

determining a correction filter to apply to the data based on the comparison, the correction filter configured to reduce the effect of the nonlinear noise on the data;

applying the correction filter to the data in the frequency domain to create corrected data in the frequency domain;

transforming the corrected data from the frequency domain back to the time domain; and

providing the corrected data for processing.

12. The method of claim 11, further comprising filtering the signal with a second correction filter configured to adjust the signal to correct for known hardware imperfections of a receiver.

13. The method of claim 11, further comprising identifying and retrieving a cyclic prefix from the signal.

14. The method of claim 11, wherein at least some of the nonlinear noise is generated by components of the transmitting radio frequency unit.

15. The method of claim 11, wherein at least some of the nonlinear noise is generated by components of a receiving radio frequency unit.

16. The method of claim 11, wherein the correction filter is configured to apply an inverse between a difference of the calculated averages and the expected frequency response in the frequency domain to the data.

17. The method of claim 11, wherein the correction filter is selected from a plurality of preexisting correction filters based on the comparison of the calculated averages to the expected frequency response.

18. The method of claim 11, wherein the expected frequency response is generated by transforming a reference signal to the frequency domain, the reference signal comprising a same sequence of symbols as the known sequence, the reference signal having not been transmitted from the transmitting radio frequency unit to an antenna.

19. The method of claim 11, wherein a microwave receiving radio frequency unit is configured to receive the signal from the transmitting radio frequency unit.

20. The method of claim 19, wherein the transmitting radio frequency unit transmits the signal to the microwave receiving radio frequency unit via line of sight propagation.

21. A non-transitory computer readable medium comprising instructions executable by a processor to perform a method, the method comprising:

receiving a signal from a transmitting radio frequency unit, the signal including data and a preamble containing bits for a known sequence of a predetermined length;

retrieving the preamble from the signal;

transforming the preamble and the data from a time domain into a frequency domain, the transforming the preamble into the frequency domain causing generation of preamble-based frequency points in the frequency domain;

calculating averages of groups of neighboring frequency points in the frequency domain, the groups of neighboring frequency points being selected from the preamble-based frequency points in the frequency domain;

comparing the calculated averages to an expected frequency response in the frequency domain, the expected frequency response being based on the known sequence of the predetermined length in the frequency domain, the comparison to be used to determine an effect of nonlinear noise in the signal;

determining a correction filter to apply to the data based on the comparison, the correction filter configured to reduce the effect of the nonlinear noise on the data;

applying the correction filter to the data in the frequency domain to create corrected data in the frequency domain;

transforming the corrected data from the frequency domain back to the time domain; and

providing the corrected data for processing.