Claims

What is claimed is:

1. A wireless communications system for transmitting an input signal, comprising:

a predistorter module configured to detect existing distortion in a feedback signal by comparing the input signal to the feedback signal and generate a distorted output signal with added distortion, the added distortion being based on the detected existing distortion;

a GaN power amplifier configured to amplify the power of the distorted output signal and generate an amplified signal;

a coupler configured to sample the amplified signal from the GaN power amplifier to generate the feedback signal;

an automatic gain adjuster (AGC) configured to adjust a gain of the feedback signal prior to the feedback signal being received by the predistorter module; and

an antenna configured to transmit the amplified signal.

2. The system of claim 1, wherein the GaN power amplifier adds amplifier distortion to the amplified signal, wherein at least some of the added distortion from the predistorter module cancels at least some of the amplifier distortion.

3. The system of claim 1, wherein the input signal is at an intermediate frequency.

4. The system of claim 1, further comprising an upconverter configured to upconvert the input signal to an intermediate frequency prior to the predistorter module comparing the input signal to the feedback signal.

5. The system of claim 1, further comprising a downconverter configured to downconvert the feedback signal to an intermediate frequency prior to the predistorter module comparing the input signal to the feedback signal.

6. The system of claim 1, further comprising an upconverter configured to upconvert the distorted output signal to a high frequency prior to the GaN power amplifier amplifying the power of the distorted output signal.

7. The system of claim 6, wherein the high frequency is the final frequency transmitted by the antenna.

8. The system of claim 1, further comprising a waveguide configured to receive the amplified signal from the GaN power amplifier and provide the amplified signal to the antenna.

9. The system of claim 8, wherein the wireless communications system is a microwave wireless communications system.

~~10. The system of claim 1, further comprising an automatic gain adjuster (AGC) configured to adjust the gain of the feedback signal prior to the feedback signal being received by the predistorter module.~~

10~~11~~. A method comprising:

receiving an input signal and a feedback signal;

adjusting a gain of the feedback signal prior to comparing the input signal to the feedback signal;

comparing the input signal and the feedback signal to detect existing distortion within the feedback signal;

generating, by a predistorter module, a distorted output signal with added distortion, the added distortion based on the detected existing distortion;

amplifying, with a GaN power amplifier, the distorted output signal to generate an amplified signal;

generating a feedback signal based on the amplified signal; and

transmitting the amplified signal with an antenna.

11~~12~~. The method of claim ~~11~~ 10, wherein the GaN power amplifier adds amplifier distortion to the amplified signal, the amplifier distortion being cancelled at least in part by the added distortion added by the predistorter module.

12~~13~~. The method of claim ~~11~~ 10, wherein the input signal is at an intermediate frequency.

13~~14~~. The method of claim ~~11~~ 10, further comprising upconverting the input signal to an intermediate frequency prior to comparing the input signal and the feedback signal.

14~~15~~. The method of claim ~~11~~ 10, further comprising downconverting the feedback signal to an intermediate frequency prior to comparing the input signal and the feedback signal.

15~~16~~. The method of claim ~~11~~ 10, further comprising upconverting the output signal to a high frequency.

16~~17~~. The method of claim ~~16~~ 15, wherein the high frequency is the final frequency transmitted by the antenna.

17~~18~~. The method of claim ~~11~~ 10, filtering the amplified signal with a waveguide filter and propagating the amplified signal from the waveguide filter through a waveguide prior to transmitting the amplified signal with the antenna.

18~~19~~. The method of claim ~~18~~ 17, wherein the antenna is a part of a microwave wireless communications system.

~~20. The method of claim 11, further comprising adjusting the gain of the feedback signal prior to comparing the input signal and the feedback signal.~~

19~~21~~. A system comprising:

a means for adjusting a gain of a feedback signal prior to comparing an input signal to the feedback signal

a means for detecting existing distortion of ~~a~~ the feedback signal by comparing the input signal to the feedback signal;

a means for generating a distorted output signal with added distortion based on the detected existing distortion;

a GaN power amplifier configured to amplify the distorted output signal to generate an amplified signal, wherein the GaN power amplifier adds amplifier distortion to the distorted output signal which is cancelled, at least in part, by the added distortion;

a means for generating a feedback signal based on the amplified signal; and

an antenna configured to transmit the amplified signal.