Claims

1. A system comprising:

a linearizer configured to use a predistortion control signal to add predistortion to a receive signal to generate a predistorted signal;

a power amplifier configured to amplify power of the predistorted signal to generate a first amplified signal, the power amplifier adding at least one of high side distortion ~~and~~ or low side ~~amplifier~~ distortion to the predistorted signal, the at least one of the high side distortion ~~and~~ or the low side ~~amplifier~~ distortion cancelling at least a portion of the predistortion; and

a feedback block configured to capture a feedback signal based on a previous amplified signal from the power amplifier, to separately ~~determine~~ sample a high side lobe and a low side ~~distortion~~ lobe of the captured feedback signal, to detect one of high side distortion associated with the high side lobe or low side distortion associated with the low side lobe based on the sampling, and to generate the predistortion control signal based on the ~~determined~~ one of the high side distortion ~~and~~ or the low side distortion detected in the captured feedback signal.

2. The system of claim 1, wherein ~~the feedback block configured to determine the high side and low side distortion of the captured feedback signal comprises~~ the feedback block is further configured to separately ~~determining~~ determine ~~a~~ the high side distortion of the captured feedback signal and~~, subsequently,~~ separately ~~determining~~ determine ~~a~~ the low side distortion of the captured feedback signal.

3. The system of claim 2, wherein ~~the feedback block configured to generate the predistortion control signal based on the determined high side and low side distortion comprises~~ the feedback block is further configured to generate the predistortion control signal based on the ~~determined~~ high side distortion and~~, subsequently, the feedback block configured to generate the predistortion control signal based on~~ the ~~determined~~ low side distortion.

4. The system of claim 3, wherein ~~the linearizer configured to use the predistortion control signal to add predistortion to the receive signal to generate the predistorted signal comprises~~ the linearizer is further configured to use the predistortion control signal based on the ~~determined~~ high side distortion ~~to add predistortion to the receive signal~~ and~~, subsequently, the linearizer configured to use the predistortion control signal based on~~ the ~~determined~~ low side distortion to add predistortion to the receive signal.

5. The system of claim 1, wherein ~~the feedback block configured to determine the high side and low side distortion of the captured feedback signal comprises~~ the feedback block is further configured to simultaneously or near simultaneously ~~determining~~ determine ~~a~~ the high side distortion and ~~a~~ the low side distortion of the captured feedback signal.

6. The system of claim 5, wherein ~~the feedback block configured to generate the predistortion control signal based on the determined high side and low side distortion comprises~~ the feedback block is further configured to generate the predistortion control signal based on both the ~~determined~~ high side distortion and the ~~determined~~ low side distortion.

7. The system of claim 6, wherein ~~the linearizer configured to use the predistortion control signal to add predistortion to the receive signal to generate the predistorted signal comprises~~ the linearizer is further configured to use the predistortion control signal based on the ~~determined~~ high side distortion and the ~~determined~~ low side distortion to add predistortion to the receive signal.

8. The system of claim ~~1~~ 2, wherein ~~the feedback block configured to generate the predistortion control signal based on the determined high side and low side distortion comprises~~ the feedback block is further configured to compare the ~~determined~~ high side distortion and the low side distortion to at least one reference signal and ~~generating~~ generate the predistortion control signal based on the comparison.

9. The system of claim 1, further comprising a sampling oscillator configured to assist in serially sampling the low side distortion of the captured feedback signal and the high side distortion of the captured feedback signal.

~~10. The system of claim 1 further comprising a splitter configured to split the feedback signal, a first oscillator and mixer module configured to assist in sampling the low side of the feedback signal from the splitter, a second oscillator and mixer module configured to assist in sampling the high side of the feedback signal from the splitter, and a combiner to combine samples from the first oscillator and mixer module and from the second oscillator and mixer module.~~

10~~11~~. A method comprising:

adding predistortion to a receive signal to generate a predistorted signal, the added predistortion being based on a predistortion control signal;

amplifying power ~~with a power amplifier~~ of the predistorted signal with a power amplifier to generate ~~a first~~ an amplified signal, the power amplifier adding one of high side distortion ~~and~~ or low side ~~amplifier~~ distortion to the predistorted signal, the high side and low side ~~amplifier~~ distortion cancelling at least a portion of the predistortion;

capturing a feedback signal based on a previous amplified signal from the power amplifier;

~~determining~~ sampling a high side lobe ~~and low side distortion~~ of the captured feedback signal to detect high side distortion associated with the previous amplified signal;

separately sampling low side lobe of the captured feedback signal to detect low side distortion associated with the previous amplified signal;

detecting distortion associated with one of the high side lobe or the low side lobe based on the sampling of the high side lobe and the low side lobe; and

generating the predistortion control signal based on the distortion associated with the one of the ~~determined~~ high side lobe ~~and~~ or the low side ~~distortion~~ lobe.

11~~12~~. The method of claim ~~11~~ 10, wherein ~~determining~~ sampling the high side lobe and the low side ~~distortion~~ lobe of the captured feedback signal comprises ~~determining~~ sampling ~~a~~ the high side ~~distortion~~ lobe of the captured feedback signal and~~, subsequently, determining~~ sampling ~~a~~ the low side ~~distortion~~ lobe of the captured feedback signal.

12~~13~~. The method of claim ~~12~~ 11, wherein generating the predistortion control signal based on the ~~determined high side and low side~~ distortion comprises generating the predistortion control signal based on one of ~~the determined~~ high side distortion associated with the high side lobe or low side distortion associated with the low side lobe ~~and, subsequently, generating the predistortion control signal based on the determined low side distortion~~.

13~~14~~. The method of claim ~~13~~ 12, wherein adding the predistortion to ~~a~~ the receive signal to generate ~~a~~ the predistorted signal, the added predistortion being based on ~~a~~ the predistortion control signal, comprises:

adding predistortion to the receive signal to generate ~~a~~ the predistorted signal, the added predistortion being based on ~~a~~ the predistortion control signal, the predistortion control signal being based on the distortion associated with the one of the ~~determined~~ high side ~~distortion~~ lobe or~~, and adding predistortion to a receive signal to generate the predistorted signal, the~~

~~added predistortion being based on a predistortion control signal, the predistortion control signal being based on~~ the ~~determined~~ low side ~~distortion~~ lobe.

14~~15~~. The method of claim ~~11~~ 10, wherein ~~determining~~ detecting the distortion associated with the one of the high side lobe ~~and~~ or the low side ~~distortion~~ lobe of the captured feedback signal comprises simultaneously or near simultaneously determining ~~a~~ high side distortion associated with the high side lobe and ~~a~~ low side distortion associated with the low side lobe of the captured feedback signal.

15~~16~~. The method of claim ~~15~~ 14, wherein generating the predistortion control signal based on the ~~determined~~ high side distortion and the low side distortion comprises generating the predistortion control signal based on both the ~~determined~~ high side distortion and the ~~determined~~ low side distortion.

16~~17~~. The method of claim ~~16~~ 15, wherein adding predistortion to ~~a~~ the receive signal to generate the predistorted signal~~,~~ comprises adding predistortion based on the predistortion control signal, the predistortion control signal being based on ~~of~~ both the determined high side distortion and the determined low side distortion.

~~18. The system of claim 6 wherein the linearizer configured to use the predistortion control signal to add predistortion to the receive signal to generate the predistorted signal comprises the linearizer configured to use the predistortion control signal based on the determined high side distortion and the determined low side distortion to add predistortion to the receive signal.~~

17~~19~~. The method of claim ~~11~~ 10, wherein generating the predistortion control signal based on the ~~determined~~ high side distortion and the low side distortion comprises comparing the ~~determined~~ high side distortion and the low side distortion to at least one reference signal and generating the predistortion control signal based on the comparison.

18~~20~~. The method of claim ~~11~~ 10, further comprising serially sampling the low side distortion of the captured feedback signal and the high side distortion of the captured feedback signal.

~~21. The method of claim 11 further comprising splitting the feedback signal, sampling the low side of the split feedback signal, sampling the high side of the split feedback signal, and combining the samples.~~

19~~22~~. A system comprising:

a linearizer configured to use a predistortion control signal to add predistortion to a receive signal to generate a predistorted signal;

a power amplifier configured to amplify power of the predistorted signal to generate a first amplified signal, the power amplifier adding at least one of high side distortion ~~and~~ or low side ~~amplifier~~ distortion to the predistorted control signal, the at least one of the high side distortion ~~and~~ or the low side ~~amplifier~~ distortion cancelling at least a portion of the predistortion;

~~a~~ means to capture a feedback signal based on a previous amplified signal from the power amplifier;

~~a~~ means to separately ~~determine~~ sample a high side lobe and a low side ~~distortion~~ lobe of the captured feedback signal;

means to detect one of high side distortion associated with the high side lobe or low side distortion associated with the low side lobe based on the sampling; and

~~a~~ means to generate the predistortion control signal based on the one of the ~~determined~~ high side distortion ~~and~~ or the low side distortion detected in the captured feedback signal.