

WHAT IS CLAIMED IS:

1. A mobile device comprising:
 - a first front end system configured to output a radio frequency receive signal and a first radio frequency observation signal; and
 - a first transceiver including a receive channel configured to process the radio frequency receive signal to generate a first digital baseband receive signal, a first observation channel configured to process the first radio frequency observation signal to generate a first digital observation signal, a first spectral regrowth baseband sampling circuit configured to process the first digital observation signal to generate spectral regrowth observation data, and a discrete time cancellation circuit configured to compensate the first digital baseband receive signal for radio frequency signal leakage based on the spectral regrowth observation data and on direct transmit leakage observation data.
2. The mobile device of claim 1 further comprising a second transceiver configured to provide the direct transmit leakage observation data to the first transceiver.
3. The mobile device of claim 2 wherein the second transceiver includes a second observation channel configured to process a second radio frequency observation signal to generate a second digital observation signal, and a direct transmit leakage baseband sampling circuit configured to process the second digital observation signal to generate the direct transmit leakage observation data.
4. The mobile device of claim 3 further comprising a second front end system configured to output the second radio frequency observation signal and a radio frequency transmit signal.
5. The mobile device of claim 4 wherein the first front end system includes a first directional coupler configured to generate the first radio frequency observation signal, and the second front end system includes a second directional coupler configured to generate the second radio frequency observation signal.

6. The mobile device of claim 5 further comprising a first antenna coupled to the first front end system and a second antenna coupled to the second front end system, the first directional coupler configured to generate the first radio frequency observation signal based on a reverse coupled path to the first antenna, and the second directional coupler configured to generate the second radio frequency observation signal based on a forward coupled path to the second antenna.

7. The mobile device of claim 4 wherein the direct transmit leakage observation data indicates an amount of direct transmit leakage present in the radio frequency transmit signal.

8. The mobile device of claim 2 wherein the second transceiver includes a discrete time cancellation circuit configured to compensate a second digital baseband receive signal for radio frequency signal leakage.

9. The mobile device of claim 1 wherein the spectral regrowth observation data indicates an amount of aggressor spectral regrowth present in the radio frequency receive signal.

10. The mobile device of claim 1 wherein the first front end system includes a first directional coupler configured to generate the first radio frequency observation signal.

11. The mobile device of claim 1 further comprising a first antenna coupled to the first front end system, the first directional coupler configured to generate the first radio frequency observation signal based on a reverse coupled path to the first antenna.

12. The mobile device of claim 11 wherein the first front end system includes a duplexer, the first directional coupler positioned between an output of the duplexer and the first antenna.

13. The mobile device of claim 11 wherein the first front end system includes a duplexer and a power amplifier, the first directional coupler positioned between an output of the power amplifier and an input to the duplexer.

14. A transceiver comprising:

a receive channel configured to process a radio frequency receive signal to generate a digital baseband receive signal;

a first observation channel configured to process a first radio frequency observation signal to generate a first digital observation signal;

a spectral regrowth baseband sampling circuit configured to process the first digital observation signal to generate spectral regrowth observation data; and

a discrete time cancellation circuit configured to compensate the digital baseband receive signal for radio frequency signal leakage based on the spectral regrowth observation data and on direct transmit leakage observation data.

15. The transceiver of claim 14 wherein the spectral regrowth observation data indicates an amount of aggressor spectral regrowth present in the radio frequency receive signal.

16. The transceiver of claim 14 wherein the direct transmit leakage observation data indicates an amount of direct transmit leakage present in an aggressor radio frequency transmit signal.

17. The transceiver of claim 14 further comprising a second observation channel configured to process a second radio frequency observation signal to generate a second digital observation signal, and a first direct transmit leakage baseband sampling circuit configured to process the second digital observation signal to generate first transmit leakage observation data.

18. A method of coexistence management in a mobile device, the method comprising:

processing a radio frequency receive signal to generate a digital baseband receive signal using a receive channel of a first transceiver;

processing a first radio frequency observation signal to generate a first digital observation signal using a first observation channel of the first transceiver;

generating spectral regrowth observation data based on processing process the first digital observation signal using a first spectral regrowth baseband sampling circuit of the first transceiver; and

compensating the digital baseband receive signal for radio frequency signal leakage based on the spectral regrowth observation data and on direct transmit leakage observation data using a discrete time cancellation circuit of the first transceiver.

19. The method of claim 18 wherein the spectral regrowth observation data indicates an amount of aggressor spectral regrowth present in the radio frequency receive signal, and the direct transmit leakage observation data indicates an amount of direct transmit leakage present in an aggressor radio frequency transmit signal.

20. The method of claim 18 further comprising receiving the direct transmit leakage observation data from a second transceiver.