

Self Interference Cancellation from a Wireless Transmitter to Receiver

This technology cancels the leakage in a transceiver, a component that transmits signal, by eliminating interference issues. This improves the signal to noise ratio, allowing the receiver to detect weak signals.

What is the Problem?

Modern wireless transceivers often transmit and receive signals simultaneously. This is problematic as the transmitted signal will interfere with the receiver's ability to detect weak signals. The integration of radios in silicon exacerbates this interference problem by placing both the transmitter and receiver in close proximity, thus reducing the isolation.

What is the Solution?

The invention is a novel method for cancellation of leakage in a transceiver, which cancels any component of the transmit signal in the receiver. This is a circuit topology which is implemented in silicon and can be made completely programmable between multiple RF standards. The invention is two methods to either suppress or remove transmit to receive interference. The first method implements in silicon, a circuit which intentionally injects a component of the transmit signal into the receiver to cancel the undesired component of the transmit signal which has leaked through the substrate, the board, or on the chip. The second method implements in silicon the function of an isolator which essentially decouples the signal path from the transmitter to the receiver. Although different circuits, with different functions, one does cancellation while the other improves isolation, they both address the same problem of self-interference from the receiver to the transmitter.

What is the Competitive Advantage?

An off-chip surface acoustic wave (SAW) filter is usually connected between the low noise amplifier and downconverter to further suppress transmitter leakage. However, these filters are band specific, prohibiting highly programmable solutions. Moreover, additional discrete filters are area inefficient, and increase cost/power consumption. Several recent efforts have attempted to attenuate or reduce the effect of transmitter leakage in the receiver signal path. However, these recent approaches tend to utilize an active cancellation path, which is problematic from a noise and power perspective. This method cancels the leakage at the source, eliminating interference issues, and allowing the receiver to detect weak signals.

Technology ID

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Category

Hardware/Electronics
Selection of Available
Technologies

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Patent Information:

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References

1. Tong Zhang, Apsara Ravish Suvarna, Venumadhav Bhagavatula, Jacques C. Rudell(41791) , <https://ieeexplore.ieee.org/document/6851653>, IEEE Radio Frequency Integrated Circuits Symposium