CLAIMS:

1. A radio transceiver, in a radio communications network, that is configured for full-duplex communication over a common frequency band, the transceiver comprising:

a multi-channel receiver configured to receive, via at least one receiver antenna, one or more first data frames from a corresponding one or more first nodes of the network during a plurality of first time slots, wherein each first data frame of the first data frames includes: (a) a plurality of first data slots, each first data slot of the first data slots being received during a different first time slot of the first time slots over a first frequency channel, within the common frequency band, that is variable between successive first data slots of the first data slots, and (b) an error correction code (ECC);

a multi-channel transmitter configured to transmit, via at least one transmitter antenna, one or more second data frames to a corresponding one or more second nodes of the network during the first time slots, wherein each second data frame of the second data frames includes: a plurality of second data slots, each second data slot of the second data slots being transmitted during a different first time slot of the first time slots over a second frequency channel, within the common frequency band, that is variable between successive second data slots of the second data slots; and

a controller configured, for a respective first data frame of the first data frames, to use the ECC of the respective first data frame to correct one or more actual self-interference-based errors in the respective first data frame, if any, each of the actual self-interference-based errors resulting from a difference in frequency that is less than a first difference between the first frequency channel over which a respective first data slot of the respective first data frame is received during a respective first time slot of the first time slots and the second frequency channel over which at least one respective second data slot of at least one of the second data frames is transmitted during the respective first time slot.

2. The radio transceiver of claim 1, wherein the actual self-interference-based errors in the first data frames are statistically dispersed over the first data frames, thereby enabling the ECC of each first data frame of the first data frames to correct the actual self-interference-based errors in the respective first data frame.

3. The radio transceiver of claim 1, wherein the controller is further configured, prior to the first time slots, to:

obtain, for the respective first data frame, the first frequency channel over which the first data slots of the respective first data frame are to be received;

obtain, for each second data frame of the second data frames, the second frequency channel over which the second data slots of the respective second data frame are to be transmitted;

determine, for at least some of the first time slots, a given difference in frequency between the first frequency channel over which a respective first data slot of the respective first data frame is to be received during the respective first time slot and at least one respective second frequency channel over which a respective second data slot of a corresponding second data frame of the second data frames is to be transmitted during the respective first time slot, wherein a determination that the given difference is less than the first difference is indicative of at least one expected self-interference-based error in the respective first data slot of the respective first data frame; and

estimate a capability of the ECC of the respective first data frame to correct the expected self-interference-based error, if any, wherein the ECC is estimated to be capable of correcting the expected self-interference-based error when a number of the first data slots of the respective first data frame that are expected to include one or more expected self-interference-based errors is less than or equal to a predefined number.

4. The radio transceiver of claim 3, wherein, upon estimating that the ECC is not capable of correcting the expected self-interference-based-error, the controller is configured to skip a transmission of the respective second data slot, thereby avoiding the expected self-interference-based error in the respective second data slot.

5. The radio transceiver of claim 3, wherein the controller is configured to determine the predefined number in accordance with one or more of the following: (a) a type of the ECC; (b) a code rate of the ECC; (c) an expected signal-to-noise ratio (SNR) for the respective first data frame, the expected SNR being estimated based on a measured SNR of data transmissions received by the receiver prior to the first time slots; or (d) an expected effect of radio-frequency interference that is external to the radio transceiver on the multi-channel receiver.

6. The radio transceiver of claim 1, wherein the receiver comprises:

a reception filter bank, configured to process each of the first data frames based on the first frequency channel thereof, the reception filter bank comprising a plurality of first filters that are associated with distinct frequency channels throughout the common frequency band; and

a demodulator configured to demodulate the first data frames.

7. The radio transceiver of claim 6, wherein the first filters include at least one of: (a) one or more first bandpass filters, or (b) one or more first notch filters.

8. The radio transceiver of claim 6, wherein the transmitter comprises:

one or more digital transmission channels configured to modulate each of the second data frames for a transmission thereof over the second frequency channel thereof; and

a transmission filter bank configured to process each of the second data frames based on the second frequency channel thereof, the transmission filter bank comprising a plurality of second filters that are associated with the distinct frequency channels.

9. The radio transceiver of claim 8, wherein the second filters include at least one of: (a) one or more second bandpass filters, or (b) one or more second notch filters.

10. The radio transceiver of claim 8, wherein the receiver further comprises:

a self-interference compensation unit configured to compensate for an effect of self-interference on one or more of the first data frames resulting from a transmission of one or more of the second data frames, thereby reducing the first difference.

11. The radio transceiver of claim 10, wherein the self-interference compensation unit comprises:

a compensation filter bank, coupled to an output of the multi-channel transmitter, and configured to process each of the second data frames based on the second frequency channel thereof, the compensation filter bank comprising a plurality of third filters that are associated with the distinct frequency channels; and

a cancellation unit configured, based on the first data frames and the second data frames, to remove components of the second data frames that are present in the first data frames.

12. A radio communications network comprising a plurality of radio transceivers that are configured for full-duplex communication over a common frequency band, each radio transceiver of the radio transceivers comprising:

a multi-channel receiver configured to receive, via at least one receiver antenna, one or more first data frames from a corresponding one or more first nodes of the network during a plurality of first time slots, wherein each first data frame of the first data frames includes: (a) a plurality of first data slots, each first data slot of the first data slots being received during a different first time slot of the first time slots over a first frequency channel, within the common frequency band, that is variable between successive first data slots of the first data slots, and (b) an error correction code (ECC);

a multi-channel transmitter configured to transmit, via at least one transmitter antenna, one or more second data frames to a corresponding one or more second nodes of the network during the first time slots, wherein each second data frame of the second data frames includes: a plurality of second data slots, each second data slot of the second data slots being transmitted during a different first time slot of the first time slots over a second frequency channel, within the common frequency band, that is variable between successive second data slots of the second data slots; and

a controller configured, for a respective first data frame of the first data frames, to use the ECC of the respective first data frame to correct one or more actual self-interference-based errors in the respective first data frame, if any, each of the actual self-interference-based errors resulting from a difference in frequency that is less than a first difference between the first frequency channel over which a respective first data slot of the respective first data frame is received during a respective first time slot of the first time slots and the second frequency channel over which at least one respective second data slot of at least one of the second data frames is transmitted during the respective first time slot.

13. A method for full-duplex communication over a common frequency band, the method comprising:

receiving, by a multi-channel receiver of a radio transceiver in a radio communications network, via at least one receiver antenna, one or more first data frames from a corresponding one or more first nodes of the network during a plurality of first time slots, wherein each first data frame of the first data frames includes: (a) a plurality of first data slots, each first data slot of the first data slots being received during a different first time slot of the first time slots over a first frequency channel, within the common frequency band, that is variable between successive first data slots of the first data slots, and (b) an error correction code (ECC);

transmitting, by a multi-channel transmitter of the radio transceiver, via at least one transmitter antenna, one or more second data frames to a corresponding one or more second nodes of the network during the first time slots, wherein each second data frame of the second data frames includes: a plurality of second data slots, each second data slot of the second data slots being transmitted during a different first time slot of the first time slots over a second frequency channel, within the common frequency band, that is variable between successive second data slots of the second data slots; and

for a respective first data frame of the first data frames, using the ECC of the respective first data frame to correct one or more actual self-interference-based errors in the respective first data frame, if any, each of the actual self-interference-based errors resulting from a difference in frequency that is less than a first difference between the first frequency channel over which a respective first data slot of the respective first data frame is received during a respective first time slot of the first time slots and the second frequency channel over which at least one respective second data slot of at least one of the second data frames is transmitted during the respective first time slot.

14. The method of claim 13, further comprising:

obtaining, for the respective first data frame, prior to the first time slots, the first frequency channel over which the first data slots of the respective first data frame are to be received;

obtaining, for each second data frame of the second data frames, prior to the first time slots, the second frequency channel over which the second data slots of the respective second data frame are to be transmitted;

determining, for at least some of the first time slots, a given difference in frequency between the first frequency channel over which a respective first data slot of the respective first data frame is to be received during the respective first time slot and at

least one respective second frequency channel over which a respective second data slot of a corresponding second data frame of the second data frames is to be transmitted during the respective first time slot, wherein a determination that the given difference is less than the first difference is indicative of at least one expected self-interference-based error in the respective first data slot of the respective first data frame; and

estimating a capability of the ECC of the respective first data frame to correct the expected self-interference-based error, if any, wherein the ECC is estimated to be capable of correcting the expected self-interference-based error when a number of the first data slots of the respective first data frame that are expected to include one or more expected self-interference-based errors is less than or equal to a predefined number.

15. The method of claim 14, wherein, upon estimating that the ECC is not capable of correcting the expected self-interference-based-error, the method further comprises:

skipping a transmission of the respective second data slot, thereby avoiding the expected self-interference-based error in the respective second data slot.

16. The method of claim 14, further comprising:

determining the predefined number in accordance with one or more of the following: (a) a type of the ECC; (b) a code rate of the ECC; (c) an expected signal-to-noise ratio (SNR) for the respective first data frame, the expected SNR being estimated based on a measured SNR of data transmissions received by the receiver prior to the first time slots; or (d) an expected effect of radio-frequency interference that is external to the radio transceiver on the multi-channel receiver.

17. The method of claim 13, wherein the receiving comprises:

processing each of the first data frames based on the first frequency channel thereof, by a reception filter bank comprising a plurality of first filters that are associated with distinct frequency channels throughout the common frequency band; and

demodulating the first data frames, by a demodulator.

18. The method of claim 17, wherein the transmitting comprises:

modulating each of the second data frames for a transmission thereof over the second frequency channel thereof, by one or more digital transmission channels; and

processing each of the second data frames based on the second frequency channel thereof, by a transmission filter bank comprising a plurality of second filters that are associated with the distinct frequency channels.

19. The method of claim 18, wherein the receiving further comprises:

compensating for an effect of self-interference on one or more of the first data frames resulting from a transmission of one or more of the second data frames, thereby reducing the first difference.

20. The method of claim 19, wherein the compensating comprises:

processing each of the second data frames based on the second frequency channel thereof, by a compensation filter bank, coupled to an output of the multi-channel transmitter, the compensation filter bank comprising a plurality of third filters that are associated with the distinct frequency channels; and

removing components of the second data frames that are present in the first data frames, based on the first data frames and the second data frames.

21. A method for full-duplex communication over a common frequency band in a radio communications network comprising a plurality of radio transceivers, the method comprising:

receiving, by at least one multi-channel receiver of a corresponding at least one radio transceiver of the radio transceivers, via a respective at least one receiver antenna, one or more first data frames from a corresponding one or more first nodes of the network during a plurality of first time slots, wherein each first data frame of the first data frames includes: (a) a plurality of first data slots, each first data slot of the first data slots being received during a different first time slot of the first time slots over a first frequency channel, within the common frequency band, that is variable between successive first data slots of the first data slots, and (b) an error correction code (ECC);

transmitting, by at least one multi-channel transmitter of the corresponding at least one radio transceiver, via a respective at least one transmitter antenna, one or more second data frames to a corresponding one or more second nodes of the network during the first time slots, wherein each second data frame of the second data frames includes: a plurality of second data slots, each second data slot of the second data slots being transmitted during a different first time slot of the first time slots over a second frequency channel,

within the common frequency band, that is variable between successive second data slots of the second data slots; and

for a respective first data frame of the first data frames, using the ECC of the respective first data frame to correct one or more actual self-interference-based errors in the respective first data frame, if any, each of the actual self-interference-based errors resulting from a difference in frequency that is less than a first difference between the first frequency channel over which a respective first data slot of the respective first data frame is received during a respective first time slot of the first time slots and the second frequency channel over which at least one respective second data slot of at least one of the second data frames is transmitted during the respective first time slot.

22. A non-transitory computer readable storage medium having computer readable program code embodied therewith, the computer readable program code, executable by at least one processor of a computer to perform a method for full-duplex communication over a common frequency band, the method comprising:

receiving, by a multi-channel receiver of a radio transceiver in a radio communications network, via at least one receiver antenna, one or more first data frames from a corresponding one or more first nodes of the network during a plurality of first time slots, wherein each first data frame of the first data frames includes: (a) a plurality of first data slots, each first data slot of the first data slots being received during a different first time slot of the first time slots over a first frequency channel, within the common frequency band, that is variable between successive first data slots of the first data slots, and (b) an error correction code (ECC);

transmitting, by a multi-channel transmitter of the radio transceiver, via at least one transmitter antenna, one or more second data frames to a corresponding one or more second nodes of the network during the first time slots, wherein each second data frame of the second data frames includes: a plurality of second data slots, each second data slot of the second data slots being transmitted during a different first time slot of the first time slots over a second frequency channel, within the common frequency band, that is variable between successive second data slots of the second data slots; and

for a respective first data frame of the first data frames, using the ECC of the respective first data frame to correct one or more actual self-interference-based errors in the respective first data frame, if any, each of the actual self-interference-based errors resulting from a difference in frequency that is less than a first difference between the

first frequency channel over which a respective first data slot of the respective first data frame is received during a respective first time slot of the first time slots and the second frequency channel over which at least one respective second data slot of at least one of the second data frames is transmitted during the respective first time slot.