CLAIMS

1. A method of wireless communication, comprising:

transmitting, by a transmitter, on shared communication spectrum using a set of allocated resources, wherein the set of allocated resources spans a plurality of transmission channels within a plurality of transmission opportunities; and

adjusting, by the transmitter, a contention window size of one or more of the plurality of transmission channels for a subsequent transmission opportunity based on acknowledgement information from a receiver for the plurality of transmission channels, wherein adjusting the contention window size of the one or more of the plurality of transmission channels for a subsequent transmission opportunity includes:

calculating, based on the acknowledgement information from the receiver for the plurality of transmission channels, an adjustment rate using a negative acknowledgement (NACK) rate for the acknowledgement information for adjusting the contention window size; and

adjusting the contention window size of the one or more of the plurality of transmission channels for the subsequent transmission opportunity by a value of the adjustment rate.

2. The method of claim 1, wherein adjusting the contention window size of the one or more of the plurality of transmission channels includes:

calculating the adjustment rate to be equal to the NACK rate for the acknowledgement information; and

adjusting, by the transmitter, the contention window size for each of the plurality of transmission channels of the subsequent transmission opportunity based on the adjustment rate.

3. The method of claim 1, wherein adjusting the contention window size of the one or more of the plurality of transmission channels includes:

determining, by the transmitter, the NACK rate for the acknowledgement information associated with each channel of the plurality of transmission channels;

generating, by the transmitter, a weighted NACK rate as the NACK rate multiplied by a ratio of one transmission channel to a number of the plurality of transmission channels;

calculating, by the transmitter, a composite adjustment number based on a combination of weighted NACK rate for each channel of the plurality of transmission channels;

calculating the adjustment rate to be equal to the composite adjustment number; and

adjusting, by the transmitter, the contention window size for each of the plurality of transmission channels of the subsequent transmission opportunity based on the adjustment number.

4. The method of claim 1, wherein adjusting the contention window size of the one or more of the plurality of transmission channels includes:

determining, by the transmitter, the NACK rate for the acknowledgement information associated with each channel of the plurality of transmission channels;

generating, by the transmitter, a weighted NACK rate as the NACK rate for the each channel multiplied by a ratio of a number of resource blocks allocated to the each channel to a total number of resource blocks allocated to the set of allocated resources;

calculating, by the transmitter, a composite adjustment number based on a combination of the weighted NACK rate for the each channel of the plurality of transmission channels;

calculating the adjustment rate to be equal to the composite adjustment number; and

adjusting, by the transmitter, the contention window size for each of the plurality of transmission channels of the subsequent transmission opportunity based on the adjustment number.

5. The method of claim 1, further including:

identifying, by the transmitter, a primary channel of the plurality of transmission channels, wherein the adjusting the contention window size of the one or more of the plurality of transmission channels for a subsequent transmission opportunity includes adjusting the primary channel.

6. The method of claim 5, wherein the identifying the primary channel is performed one of: semi-statically, or dynamically.

7. The method of claim 5, wherein the identifying the primary channel includes:

determining a transmission channel of the plurality of transmission channels having a

highest number of resource blocks of the set of allocated resources; and

designating the transmission channel as the primary channel.

8. An apparatus configured for wireless communication, the apparatus comprising:

at least one processor; and

a memory coupled to the at least one processor,

wherein the at least one processor is configured:

to transmit, by a transmitter, on shared communication spectrum using a set of allocated resources, wherein the set of allocated resources spans a plurality of transmission channels within a plurality of transmission opportunities; and

to adjust, by the transmitter, a contention window size of one or more of the plurality of transmission channels for a subsequent transmission opportunity based on acknowledgement information from a receiver for each of the plurality of transmission channels, wherein the configuration of the at least one processor to adjust the contention window size of the one or more of the plurality of transmission channels for a subsequent transmission opportunity includes configuration of the at least one processor:

to calculate, based on the acknowledgement information from the receiver for the plurality of transmission channels, an adjustment rate using a negative acknowledgement (NACK) rate for the acknowledgement information for adjusting the contention window size; and

to adjust the contention window size of the one or more of the plurality of transmission channels for the subsequent transmission opportunity by a value of the adjustment rate.

9. The apparatus of claim 8, wherein the configuration of the at least one processor to adjust the contention window size of the one or more of the plurality of transmission channels includes configuration of the at least one processor:

to calculate the adjustment rate to be equal to the NACK rate for the acknowledgement information; and

to adjust, by the transmitter, the contention window size for each of the plurality of transmission channels of the subsequent transmission opportunity based on the adjustment rate.

10. The apparatus of claim 8, wherein the configuration of the at least one processor to adjust the contention window size of the one or more of the plurality of transmission channels includes configuration of the at least one processor:

to determine, by the transmitter, the NACK rate for the acknowledgement information associated with each channel of the plurality of transmission channels;

to generate, by the transmitter, a weighted NACK rate as the NACK rate multiplied by a ratio of one transmission channel to a number of the plurality of transmission channels;

to calculate, by the transmitter, a composite adjustment number based on a combination of weighted NACK rate for each channel of the plurality of transmission channels;

to calculate the adjustment rate to be equal to the composite adjustment number; and

to adjust, by the transmitter, the contention window size for each of the plurality of transmission channels of the subsequent transmission opportunity based on the adjustment number.

11. The apparatus of claim 8, wherein the configuration of the at least one processor to adjust the contention window size of the one or more of the plurality of transmission channels includes configuration of the at least one processor:

to determine, by the transmitter, the NACK rate for the acknowledgement information associated with each channel of the plurality of transmission channels;

to generate, by the transmitter, a weighted NACK rate as the NACK rate for the each channel multiplied by a ratio of a number of resource blocks allocated to the each channel to a total number of resource blocks allocated to the set of allocated resources;

to calculate, by the transmitter, a composite adjustment number based on a combination of the weighted NACK rate for the each channel of the plurality of transmission channels;

to calculate the adjustment rate to be equal to the composite adjustment number; and

to adjust, by the transmitter, the contention window size for each of the plurality of transmission channels of the subsequent transmission opportunity based on the adjustment number.

12. The apparatus of claim 8, further including configuration of the at least one processor to identify, by the transmitter, a primary channel of the plurality of transmission channels, wherein the configuration of the at least one processor to adjust the contention window

size of the one or more of the plurality of transmission channels for a subsequent transmission opportunity includes configuration to adjust the primary channel.

13. The apparatus of claim 12, wherein the configuration of the at least one processor to identify the primary channel is performed one of: semi-statically, or dynamically.

14. The apparatus of claim 12, wherein the configuration of the at least one processor to identify the primary channel includes configuration of the at least one processor:

to determine a transmission channel of the plurality of transmission channels having a highest number of resource blocks of the set of allocated resources; and

to designate the transmission channel as the primary channel.

15. A non-transitory computer-readable medium storing instructions that, when executed by a processor, cause the processor to perform operations comprising:

transmitting, by a transmitter, on shared communication spectrum using a set of allocated resources, wherein the set of allocated resources spans a plurality of transmission channels within a plurality of transmission opportunities; and

adjusting, by the transmitter, a contention window size of one or more of the plurality of transmission channels for a subsequent transmission opportunity based on acknowledgement information from a receiver for the plurality of transmission channels, wherein adjusting the contention window size of the one or more of the plurality of transmission channels for a subsequent transmission opportunity includes:

calculating, based on the acknowledgement information from the receiver for the plurality of transmission channels, an adjustment rate using a negative acknowledgement (NACK) rate for the acknowledgement information for adjusting the contention window size; and

adjusting the contention window size of the one or more of the plurality of transmission channels for the subsequent transmission opportunity by a value of the adjustment rate.

16. The non-transitory computer-readable medium of claim 15, wherein adjusting the contention window size of the one or more of the plurality of transmission channels includes:

calculating the adjustment rate to be equal to the NACK rate for the acknowledgement information; and

adjusting, by the transmitter, the contention window size for each of the plurality of transmission channels of the subsequent transmission opportunity based on the adjustment rate.

17. The non-transitory computer-readable medium of claim 15, wherein adjusting the contention window size of the one or more of the plurality of transmission channels includes:

determining, by the transmitter, the NACK rate for the acknowledgement information associated with each channel of the plurality of transmission channels;

generating, by the transmitter, a weighted NACK rate as the NACK rate multiplied by a ratio of one transmission channel to a number of the plurality of transmission channels;

calculating, by the transmitter, a composite adjustment number based on a combination of weighted NACK rate for each channel of the plurality of transmission channels;

calculating the adjustment rate to be equal to the composite adjustment number; and

adjusting, by the transmitter, the contention window size for each of the plurality of transmission channels of the subsequent transmission opportunity based on the adjustment number.

18. The non-transitory computer-readable medium of claim 15, wherein adjusting the contention window size of the one or more of the plurality of transmission channels includes:

determining, by the transmitter, the NACK rate for the acknowledgement information associated with each channel of the plurality of transmission channels;

generating, by the transmitter, a weighted NACK rate as the NACK rate for the each channel multiplied by a ratio of a number of resource blocks allocated to the each channel to a total number of resource blocks allocated to the set of allocated resources;

calculating, by the transmitter, a composite adjustment number based on a combination of the weighted NACK rate for the each channel of the plurality of transmission channels;

calculating the adjustment rate to be equal to the composite adjustment number; and

adjusting, by the transmitter, the contention window size for each of the plurality of transmission channels of the subsequent transmission opportunity based on the adjustment number.

19. The non-transitory computer-readable medium of claim 15, further including:

identifying, by the transmitter, a primary channel of the plurality of transmission channels, wherein the adjusting the contention window size of the one or more of the plurality of transmission channels for a subsequent transmission opportunity includes adjusting the primary channel.

20. The non-transitory computer-readable medium of claim 19, wherein the identifying the primary channel is performed one of: semi-statically, or dynamically.

21. The non-transitory computer-readable medium of claim 19, wherein the identifying the primary channel includes:

determining a transmission channel of the plurality of transmission channels having a highest number of resource blocks of the set of allocated resources; and

designating the transmission channel as the primary channel.

22. An apparatus configured for wireless communication, the apparatus comprising:

means for transmitting, by a transmitter, on shared communication spectrum using a set of allocated resources, wherein the set of allocated resources spans a plurality of transmission channels within a plurality of transmission opportunities; and

means for adjusting, by the transmitter, a contention window size of one or more of the plurality of transmission channels for a subsequent transmission opportunity based on acknowledgement information from a receiver for the plurality of transmission channels, wherein the means for adjusting the contention window size of the one or more of the plurality of transmission channels for a subsequent transmission opportunity include:

means for calculating, based on the acknowledgement information from the receiver for the plurality of transmission channels, an adjustment rate using a negative acknowledgement (NACK) rate for the acknowledgement information for adjusting the contention window size; and

means for adjusting the contention window size of the one or more of the plurality of transmission channels for the subsequent transmission opportunity by a value of the adjustment rate.

23. The apparatus of claim 22, wherein the means for adjusting the contention window size of the one or more of the plurality of transmission channels include:

means for calculating the adjustment rate to be equal to the NACK rate for the acknowledgement information; and

means for adjusting, by the transmitter, the contention window size for each of the plurality of transmission channels of the subsequent transmission opportunity based on the adjustment rate.

24. The apparatus of claim 22, wherein the means for adjusting the contention window size of the one or more of the plurality of transmission channels include:

means for determining, by the transmitter, the NACK rate for the acknowledgement information associated with each channel of the plurality of transmission channels;

means for generating, by the transmitter, a weighted NACK rate as the NACK rate multiplied by a ratio of one transmission channel to a number of the plurality of transmission channels;

means for calculating, by the transmitter, a composite adjustment number based on a combination of weighted NACK rate for each channel of the plurality of transmission channels;

calculating the adjustment rate to be equal to the composite adjustment number; and

means for adjusting, by the transmitter, the contention window size for each of the plurality of transmission channels of the subsequent transmission opportunity based on the adjustment number.

25. The apparatus of claim 22, wherein the means for adjusting the contention window size of the one or more of the plurality of transmission channels include:

means for determining, by the transmitter, the NACK rate for the acknowledgement information associated with each channel of the plurality of transmission channels;

means for generating, by the transmitter, a weighted NACK rate as the NACK rate for the each channel multiplied by a ratio of a number of resource blocks allocated to the each channel to a total number of resource blocks allocated to the set of allocated resources;

means for calculating, by the transmitter, a composite adjustment number based on a combination of the weighted NACK rate for the each channel of the plurality of transmission channels;

calculating the adjustment rate to be equal to the composite adjustment number; and

means for adjusting, by the transmitter, the contention window size for each of the plurality of transmission channels of the subsequent transmission opportunity based on the adjustment number.

26. The apparatus of claim 22, further including:

means for identifying, by the transmitter, a primary channel of the plurality of transmission channels, wherein the adjusting the contention window size of the one or more of the plurality of transmission channels for a subsequent transmission opportunity includes adjusting the primary channel.

27. The apparatus of claim 26, wherein the means for identifying the primary channel is performed one of: semi-statically, or dynamically.

28. The apparatus of claim 26, wherein the means for identifying the primary channel includes:

means for determining a transmission channel of the plurality of transmission channels having a highest number of resource blocks of the set of allocated resources; and

means for designating the transmission channel as the primary channel.