CLAIMS

1. An apparatus for wireless communication at a user equipment (UE), comprising:

a processor,

memory in electronic communication with the processor; and

instructions stored in the memory and executable by the processor to cause the apparatus to:

identify a plurality of carriers and a plurality of sub-bands within the plurality of carriers configured for uplink transmissions from the UE to a base station in a shared radio frequency spectrum;

select a carrier from the plurality of carriers and one sub-band of two or more sub-bands within the carrier on which to perform a listen-before-talk procedure of a first type, the two or more sub-bands being a part of the plurality of sub-bands configured for the uplink transmissions;

perform the listen-before-talk procedure of the first type on the one sub-band of the two or more sub-bands within the selected carrier;

perform one or more listen-before-talk procedures of a second type on sub-bands of the plurality of sub-bands within carriers of the plurality of carriers different from the selected carrier;

perform one or more listen-before-talk procedures of the second type on remaining sub-bands of the two or more sub-bands within the selected carrier;

determine that at least one listen-before-talk procedure of the first type on the one sub-band or of the second type on the remaining sub-bands has failed; and

communicate on the carriers of the plurality of carriers different from the selected carrier based at least in part on the listen-before-talk procedure of the first type and the one or more listen-before-talk procedures of the second type, wherein communicating on the carriers of the plurality of carriers different from the selected carrier comprises suppressing communication on the selected carrier based at least in part on determining that the at least one listen-before-talk procedure on sub-bands of the selected carrier has failed.

2. The apparatus of claim 1, wherein the listen-before-talk procedure of the first type comprises a first listen-before-talk procedure of the first type, wherein the instructions are further executable by the processor to cause the apparatus to:

initiate a second listen-before-talk procedure of the first type based at least in part on the determining.

3. The apparatus of claim 2, wherein the instructions are further executable by the processor to cause the apparatus to:

initiate the second listen-before-talk procedure of the first type within a threshold amount of time after determining that the first listen-before-talk procedure of the first type failed.

4. The apparatus of claim 2, wherein the instructions are further executable by the processor to cause the apparatus to:

initiate the second listen-before-talk procedure of the first type after receiving an uplink allocation for subsequent uplink transmissions.

5. The apparatus of claim 2, wherein the instructions are further executable by the processor to cause the apparatus to:

initiate the second listen-before-talk procedure during the first listen-before-talk procedure of the first type based at least in part on a determined likelihood indicates that the first listen-before-talk procedure of the first type will fail, wherein the first listen-before-talk procedure of the first type is interrupted and stopped due to the second listen-before-talk procedure of the first type.

6. The apparatus of claim 2, wherein the instructions are further executable by the processor to cause the apparatus to:

select another sub-band of the two or more sub-bands within the selected carrier on which to perform the second listen-before-talk procedure of the first type.

7. The apparatus of claim 2, wherein the wherein the instructions executable by the processor to cause the apparatus to select the other sub-band of the two or more sub-bands within the selected carrier select the other sub-band based at least in part on determining that a time duration has not expired prior to initiating the second listen-before-talk procedure.

8. The apparatus of claim 2, wherein the instructions are further executable by the processor to cause the apparatus to:

select another carrier from the plurality of carriers and a sub-band of the plurality of sub-bands within the other carrier on which to perform the second listen-before-talk procedure of the first type.

9. The apparatus of claim 1, wherein the instructions are further executable by the processor to cause the apparatus to:

determine that the listen-before-talk procedure of the first type performed on the at least one sub-band of the two or more sub-bands within the selected carrier is successful and that the one or more listen-before-talk procedures of the second type performed on the remaining sub-bands of the two or more sub-bands within the selected carrier are successful;

determine that a listen-before-talk procedure of the second type performed on a sub-band of the plurality of sub-bands within a carrier of the plurality of carriers that is different from the selected carrier is successful; and

transmit at least a portion of the uplink transmissions on the sub-band within the carrier.

10. The apparatus of claim 1, wherein the instructions are further executable by the processor to cause the apparatus to:

determine that the listen-before-talk procedure of the first type performed on the at least one sub-band of the two or more sub-bands within the selected carrier is successful and that a listen-before-talk procedure of the second type performed on at least one of the remaining sub-bands of the two or more sub-bands within the selected carrier has failed; and

determine that a listen-before-talk procedure of the second type performed on a sub-band of the plurality of sub-bands within a carrier of the plurality of carriers that is different from the selected carrier is successful.

11. The apparatus of claim 10, wherein the instructions are further executable by the processor to cause the apparatus to:

transmit at least a portion of the uplink transmissions on the sub-band within the carrier.

12. The apparatus of claim 10, wherein the instructions are further executable by the processor to cause the apparatus to:

suppress the uplink transmissions on the sub-band within the carrier.

13. The apparatus of claim 12, wherein the instructions are further executable by the processor to cause the apparatus to:

determine that the listen-before-talk procedure of the first type is successful, a subsequent listen-before-talk procedure of the second type, performed after the suppressing, on the at least one of the remaining sub-bands of the two or more sub-bands within the selected carrier is successful, and the listen-before-talk procedure of the second type performed on the sub-band of the plurality of sub-bands within the carrier is successful; and

transmit at least a portion of the uplink transmissions on the sub-band within the carrier.

14. The apparatus of claim 10, wherein the instructions are further executable by the processor to cause the apparatus to:

initiate a second listen-before-talk procedure of the second type on the at least one of the remaining sub-bands of the two or more sub-bands within the selected carrier.

15. The apparatus of claim 14, wherein the instructions executable by the processor to cause the apparatus to initiate the second listen-before-talk procedure of the second type is based at least in part on a number of allowed attempts at the listen before-talk procedure of the second type, a minimum time between attempts at the listen before-talk procedure of the second type, or a time allotted for attempts at the listen-before-talk procedure of the second type.

16. The apparatus of claim 1, wherein the at least one sub-band of the two or more sub-bands within the selected carrier comprises all of the two or more sub-bands within the selected carrier, and wherein performing the listen-before-talk procedure of the first type on all of the two or more sub-bands within the selected carrier comprises additional instructions executable by the processor to cause the apparatus to:

perform a joint listen-before-talk procedure of the first type on all of the two or more sub-bands within the selected carrier.

17. The apparatus of claim 16, wherein the instructions are further executable by the processor to cause the apparatus to:

determine that the joint listen-before-talk procedure of the first type performed on all of the two or more sub-bands within the selected carrier is successful;

determine that a listen-before-talk procedure of the second type performed on a sub-band of the plurality of sub-bands within a carrier of the plurality of carriers that is different from the selected carrier is successful; and

transmit the uplink transmissions or a portion of the uplink transmissions on the sub-band within the carrier.

18. The apparatus of claim 16, wherein the instructions are further executable by the processor to cause the apparatus to:

determine that the joint listen-before-talk procedure of the first type performed on all of the two or more sub-bands within the selected carrier has failed;

determine that a listen-before-talk procedure of the second type performed on a sub-band of the plurality of sub-bands within a carrier of the plurality of carriers that is different from the selected carrier is successful; and

suppress the uplink transmissions on the sub-band within the carrier.

19. The apparatus of claim 16, wherein the instructions executable by the processor to cause the apparatus to perform the joint listen-before-talk procedure of the first type on all of the two or more sub-bands within the selected carrier comprise instructions executable by the processor to cause the apparatus to:

monitor all of the two or more sub-bands within the selected carrier for energy to determine whether the carrier is available for communicating with the base station, wherein a counter associated with the joint listen-before-talk procedure of the first type is decremented when no energy greater than a threshold is detected on all monitored sub-bands within the selected carrier.

20. The apparatus of claim 19, wherein an initial value of the counter is selected based at least in part on a largest contention window size of a set of contention window sizes associated with respective sub-bands.

21. The apparatus of claim 19, wherein an initial value of the counter is selected based at least in part on a contention window size associated with all monitored sub-bands, and wherein the contention window size is decremented based at least in part on acknowledgements received on any of the monitored sub-bands and is incremented based at least in part on negative acknowledgements received on any of the monitored sub-bands.

22. The apparatus of claim 1, wherein the instructions executable by the processor to cause the apparatus to select the at least one sub-band of the two or more sub-bands within the carrier comprise instructions executable by the processor to cause the apparatus to:

randomly select the at least one sub-band of the two or more sub-bands within the carrier on which to perform the listen-before-talk procedure of the first type.

23. The apparatus of claim 1, wherein the instructions executable by the processor to cause the apparatus to select the at least one sub-band of the two or more sub-bands within the carrier comprise instructions executable by the processor to cause the apparatus to:

receive an indication from the base station that the UE is to perform the listen-before-talk procedure of the first type on the at least one sub-band of the two or more sub-bands within the carrier; and

select the at least one sub-band of the two or more sub-bands within the carrier on which to perform the listen-before-talk procedure of the first type based at least in part on the received indication.

24. The apparatus of claim 1, wherein the listen-before-talk procedure of the first type comprises a fairness-based listen-before-talk procedure for performing channel sensing and backoff and the one or more listen-before-talk procedures of the second type comprise one-time listen-before-talk procedures.

25. A method for wireless communication at a user equipment (UE), comprising:

identifying a plurality of carriers and a plurality of sub-bands within the plurality of carriers configured for uplink transmissions from the UE to a base station in a shared radio frequency spectrum;

selecting a carrier from the plurality of carriers and one sub-band of two or more sub-bands within the carrier on which to perform a listen-before-talk procedure of a first type, the two or more sub-bands being a part of the plurality of sub-bands configured for the uplink transmissions;

performing the listen-before-talk procedure of the first type on the one sub-band of the two or more sub-bands within the selected carrier;

performing one or more listen-before-talk procedures of a second type on sub-bands of the plurality of sub-bands within carriers of the plurality of carriers different from the selected carrier;

performing one or more listen-before-talk procedures of the second type on remaining sub-bands of the two or more sub-bands within the selected carrier;

determining that at least one listen-before-talk procedure of the first type on the one sub-band or of the second type on the remaining sub-bands has failed; and

communicating on the carriers of the plurality of carriers different from the selected carrier based at least in part on the listen-before-talk procedure of the first type and the one or more listen-before-talk procedures of the second type, wherein communicating on the carriers of the plurality of carriers different from the selected carrier comprises suppressing communication on the selected carrier based at least in part on determining that the at least one listen-before-talk procedure on sub-bands of the selected carrier has failed.

26. The method of claim 25, wherein the listen-before-talk procedure of the first type comprises a first listen-before-talk procedure of the first type, wherein the instructions are further executable by the processor to cause the apparatus to:

initiating a second listen-before-talk procedure of the first type based at least in part on the determining.