CLAIMS

1. A method for wireless communications at a user equipment (UE), comprising:

receiving a system information message comprising a first frequency hopping configuration for a first coverage enhancement (CE) mode with a first frequency hopping interval and a second frequency hopping configuration for a second CE mode with a second frequency hopping interval, wherein the first frequency hopping interval is different than the second frequency hopping interval;

receiving an uplink resource configuration for uplink communications in an idle mode, the uplink resource configuration comprising an indicator associated with allocated resources for the uplink communications in the idle mode and a set of parameters comprising one or more of: a frequency hopping indicator, a frequency hopping interval indicator, a CE mode indicator, a repetition level indicator, or a subcarrier spacing for the uplink communications;

transmitting, while in the idle mode, a first uplink transmission associated with a transport block on the allocated resources and according to one or more of the set of parameters;

transmitting the first uplink transmission according to either:

the second frequency hopping configuration for the second CE mode using the second frequency hopping interval based at least in part on the repetition level indicator indicating a number of repetitions for the first uplink transmission satisfying a threshold number of repetitions; or

the first frequency hopping configuration for the first CE mode using the first frequency hopping interval based at least in part on identifying that the UE was configured for the first CE mode at a time that the UE received the uplink resource configuration; and

monitoring for a response to the first uplink transmission.

2. The method of claim 1, wherein the frequency hopping indicator indicates whether frequency hopping is enabled for the first uplink transmission, and the first uplink transmission is transmitted according to the frequency hopping indicator.

3. The method of claim 2, wherein the uplink resource configuration comprises a frequency hopping configuration for the uplink communications indicating a frequency offset or a number of transmission subframes for the frequency hopping.

4. The method of claim 2, further comprising:

transmitting a capability message comprising a first indication of a UE capability to support frequency hopping for the uplink communications in a connected mode and a second indication of a UE capability to support frequency hopping for the uplink communications in the idle mode.

5. The method of claim 4, wherein the second indication comprises a single capability indication of whether the UE supports frequency hopping for all channels.

6. The method of claim 4, wherein the second indication comprises a downlink capability indication indicating whether the UE supports frequency hopping for downlink channels and an uplink capability indication indicating whether the UE supports frequency hopping for uplink channels.

7. The method of claim 4, wherein the second indication comprises a plurality of capability indications of whether the UE supports frequency hopping for a plurality of corresponding channels.

8. The method of claim 2, further comprising:

transmitting the first uplink transmission according to the first frequency hopping configuration for the first CE mode using the first frequency hopping interval based at least in part on a default CE mode for the UE in the idle mode.

9. The method of claim 2, further comprising:

transmitting the first uplink transmission according to the first frequency hopping configuration for the first CE mode using the first frequency hopping interval based at least in part on the CE mode indicator.

10. The method of claim 2, wherein the first frequency hopping configuration indicates a frequency offset and a number of transmission subframes for the frequency hopping.

11. The method of claim 2, further comprising:

transmitting a capability message comprising an indication of a UE capability to support frequency hopping for the uplink communications in a connected mode and the uplink communications in the idle mode.

12. The method of claim 1, further comprising:

receiving the response to the first uplink transmission, the response comprising a grant for one or more retransmissions of the first uplink transmission; and

transmitting a second uplink transmission associated with the transport block based at least in part on the grant.

13. The method of claim 12, wherein the uplink resource configuration comprises a first frequency hopping indicator that indicates whether frequency hopping is enabled for the first uplink transmission and for the one or more retransmissions of the first uplink transmission, and the second uplink transmission is transmitted according to the first frequency hopping indicator.

14. The method of claim 12, wherein the uplink resource configuration comprises a first frequency hopping indicator that indicates whether frequency hopping is enabled for the first uplink transmission and a second frequency hopping indicator that indicates whether frequency hopping is enabled for the one or more retransmissions of the first uplink transmission, and the second uplink transmission is transmitted according to the second frequency hopping indicator.

15. The method of claim 12, wherein the grant for the one or more retransmissions of the first uplink transmission comprises a first timing advance command indicating a first timing advance to be applied for the one or more retransmissions of the first uplink transmission,

wherein transmitting the second uplink transmission is based at least in part on the first timing advance.

16. The method of claim 15, further comprising:

receiving a second response to the second uplink transmission, the second response comprising a second grant for one or more second retransmissions of the first uplink transmission, wherein the second grant comprises a second timing advance command indicating a second timing advance to be applied for the one or more second retransmissions of the first uplink transmission; and

transmitting a third uplink transmission based at least in part on the second timing advance.

17. The method of claim 15, further comprising:

determining a delay time between receiving the grant and transmitting the second uplink transmission based at least in part on a presence of the first timing advance command in the grant.

18. The method of claim 15, wherein a first delay time between receiving grants and transmitting uplink transmissions is configured for uplink transmissions in a connected mode, the method further comprising:

determining a second delay time between receiving the grant and transmitting the second uplink transmission, wherein the second delay time is different than the first delay time.

19. The method of claim 12, wherein the grant for the one or more retransmissions of the first uplink transmission comprises a power control command indicating an adjustment to an uplink transmission power for the one or more retransmissions of the first uplink transmission, and wherein transmitting the second uplink transmission is based at least in part on the indicated adjustment to the uplink transmission power, and wherein a correspondence between the power control command and the adjustment to the uplink transmission power for the one or more retransmissions of the first uplink transmission is different from a correspondence

between power control commands and uplink transmission power adjustments for a connected mode.

20. The method of claim 12, wherein the grant for the one or more retransmissions of the first uplink transmission comprises a repetition indicator that indicates a number of repetitions for transmitting the one or more retransmissions of the first uplink transmission, wherein the second uplink transmission is transmitted in accordance with the indicated number of repetitions.

21. The method of claim 20, wherein the number of repetitions indicated by the repetition indicator is based at least in part on a number of repetitions for the first uplink transmission.

22. The method of claim 20, wherein the uplink resource configuration comprises an indicator of a correspondence between a value for the repetition indicator and the number of repetitions indicated by the repetition indicator.

23. The method of claim 22, wherein the indicator of the correspondence between the value for the repetition indicator and the number of repetitions indicated by the repetition indicator comprises a maximum number of repetitions for transmitting the one or more retransmissions of the first uplink transmission.

24. The method of claim 20, wherein the system information message comprises a first maximum repetition indicator that indicates a maximum number of repetitions for the first CE mode and a second maximum repetition indicator that indicates a maximum number of repetitions for the second CE mode, wherein the uplink resource configuration comprises the CE mode indicator, and wherein a correspondence between a value for the repetition indicator and the number of repetitions indicated by the repetition indicator is determined based at least in part on one of the first maximum repetition indicator or the second maximum repetition indicator, and wherein the one of the first maximum repetition indicator or the second maximum repetition indicator is determined based at least in part on the CE mode indicator.

25. The method of claim 1, wherein the set of parameters of the uplink resource configuration comprises a feature support indication indicating support for one or more of: an enhanced transport block size (TBS), a modulation and coding scheme (MCS), an enhanced bandwidth, sub-physical resource block (PRB) allocation, or flexible resource allocation for the uplink communications in the idle mode, and wherein a set of fields of a downlink control information message received while in the idle mode is interpreted based at least in part on the feature support indication.

26. The method of claim 25, further comprising:

transmitting a capability message comprising a feature capability indication of UE capability support for the enhanced TBS, the MCS, the enhanced bandwidth, the sub-PRB allocation, or the flexible resource allocation for the uplink communications in the idle mode, wherein the feature support indication is based at least in part on the feature capability indication.

27. The method of claim 1, wherein the uplink resource configuration is received in a radio resource control (RRC) message.

28. The method of claim 1, wherein the first uplink transmission is transmitted in a physical uplink shared channel (PUSCH).

29. A method for wireless communications at a base station, comprising:

transmitting a system information message comprising a first frequency hopping configuration for a first coverage enhancement (CE) mode with a first frequency hopping interval and a second frequency hopping configuration for a second CE mode with a second frequency hopping interval, wherein the first frequency hopping interval is different than the second frequency hopping interval;

transmitting, to a user equipment (UE) in a connected mode, an uplink resource configuration for uplink communications from the UE in an idle mode, the uplink resource configuration comprising an indicator associated with allocated resources for the uplink communications in the idle mode and a set of parameters comprising one or more of: a frequency

hopping indicator, a frequency hopping interval indicator, a CE mode indicator, a repetition level indicator, or a subcarrier spacing for the uplink communications;

receiving, from the UE subsequent to the UE transitioning from the connected mode to the idle mode, a first uplink transmission associated with a transport block on the allocated resources and according to the uplink resource configuration;

receiving the first uplink transmission according to either:

the second frequency hopping configuration for the second CE mode using the second frequency hopping interval based at least in part on the repetition level indicator indicating a number of repetitions for the first uplink transmission satisfying a threshold number of repetitions; or

the first frequency hopping configuration for the first CE mode using the first frequency hopping interval based at least in part on identifying that the UE was configured for the first CE mode at a time that the UE received the uplink resource configuration;

determining whether the first uplink transmission was successfully received; and

transmitting a response to the first uplink transmission based at least in part on whether the first uplink transmission was successfully received.

30. The method of claim 29, wherein the frequency hopping indicator indicates whether frequency hopping is enabled for the first uplink transmission, and the first uplink transmission is received according to the frequency hopping indicator.

31. The method of claim 30, wherein the uplink resource configuration comprises a frequency hopping configuration for the uplink communications indicating a frequency offset or a number of transmission subframes for the frequency hopping.

32. The method of claim 30, further comprising:

receiving the first uplink transmission according to the first frequency hopping configuration for the first CE mode using the first frequency hopping interval based at least in part on a default CE mode for the UE in the idle mode.

33. The method of claim 30, further comprising:

receiving the first uplink transmission according to the first frequency hopping configuration for the first CE mode using the first frequency hopping interval based at least in part on the CE mode indicator.

34. The method of claim 30, further comprising:

receiving a capability message comprising a first indicator of a UE capability to support frequency hopping for the uplink communications in the connected mode and a second indicator of a UE capability to support frequency hopping for the uplink communications in the idle mode, wherein the frequency hopping indicator is based at least in part on the UE capability to support frequency hopping for the uplink communications in the idle mode.

35. The method of claim 34, wherein the second indicator comprises a single capability indicator of whether the UE supports frequency hopping for all channels.

36. The method of claim 34, wherein the second indicator comprises a downlink capability indicator indicating whether the UE supports frequency hopping for downlink channels and an uplink capability indicator indicating whether the UE supports frequency hopping for uplink channels.

37. The method of claim 34, wherein the second indicator comprises a plurality of capability indicators of whether the UE supports frequency hopping for a plurality of corresponding channels.

38. The method of claim 30, wherein the first frequency hopping configuration indicates a frequency offset and a number of transmission subframes for the frequency hopping.

39. The method of claim 30, further comprising:

receiving a capability message comprising an indication of a UE capability to support frequency hopping for the uplink communications in the connected mode and the uplink

communications in the idle mode, wherein the frequency hopping indicator is based at least in part on the UE capability to support frequency hopping.

40. The method of claim 29, further comprising:

determining that the first uplink transmission was not successfully received;

transmitting, in the response to the first uplink transmission, a grant for one or more retransmissions of the first uplink transmission; and

receiving a second uplink transmission associated with the transport block based at least in part on the grant.

41. The method of claim 40, wherein the uplink resource configuration comprises a first frequency hopping indicator that indicates whether frequency hopping is enabled for the first uplink transmission and for the one or more retransmissions of the first uplink transmission, and the second uplink transmission is received according to the first frequency hopping indicator.

42. The method of claim 40, wherein the uplink resource configuration comprises a first frequency hopping indicator that indicates whether frequency hopping is enabled for the first uplink transmission and a second frequency hopping indicator that indicates whether frequency hopping is enabled for the one or more retransmissions of the first uplink transmission, and the second uplink transmission is received according to the second frequency hopping indicator.

43. The method of claim 40, wherein the grant for the one or more retransmissions of the first uplink transmission comprises a first timing advance command indicating a first timing advance to be applied for the one or more retransmissions of the first uplink transmission, wherein receiving the second uplink transmission is based at least in part on the first timing advance.

44. The method of claim 43, further comprising:

transmitting a second response to the second uplink transmission, the second response comprising a second grant for one or more second retransmissions of the first uplink

transmission, wherein the second grant comprises a second timing advance command indicating a second timing advance to be applied for the one or more second retransmissions of the first uplink transmission; and

receiving a third uplink transmission based at least in part on the second timing advance.

45. The method of claim 43, wherein a delay time between transmitting the grant and receiving the second uplink transmission is based at least in part on a presence of the first timing advance command in the grant.

46. The method of claim 43, wherein a first delay time between transmitting grants and receiving uplink transmissions is configured for uplink transmissions in the connected mode, and a second delay time between transmitting the grant and receiving the second uplink transmission, wherein the second delay time is different than the first delay time.

47. The method of claim 40, wherein the grant for the one or more retransmissions of the first uplink transmission comprises a power control command indicating an adjustment to an uplink transmission power for the one or more retransmissions of the first uplink transmission, and wherein receiving the second uplink transmission is based at least in part on the indicated adjustment to the uplink transmission power, and wherein a correspondence between the power control command and the adjustment to the uplink transmission power for the one or more retransmissions of the first uplink transmission is different from a correspondence between power control commands and uplink transmission power adjustments for the connected mode.

48. The method of claim 40, wherein the grant for the one or more retransmissions of the first uplink transmission comprises a repetition indicator that indicates a number of repetitions for the UE to transmit the one or more retransmissions of the first uplink transmission, wherein the second uplink transmission is received in accordance with the indicated number of repetitions.

49. The method of claim 48, wherein the number of repetitions indicated by the repetition indicator is based at least in part on a number of repetitions for the first uplink transmission.

50. The method of claim 48, wherein the uplink resource configuration comprises an indicator of a correspondence between a value for the repetition indicator and the number of repetitions indicated by the repetition indicator.

51. The method of claim 50, wherein the indicator of the correspondence between the value for the repetition indicator and the number of repetitions indicated by the repetition indicator comprises a maximum number of repetitions for the UE to transmit the one or more retransmissions of the first uplink transmission.

52. The method of claim 48,

wherein the system information message comprises a first maximum repetition indicator that indicates a maximum number of repetitions for the first CE mode and a second maximum repetition indicator that indicates a maximum number of repetitions for the second CE mode,

wherein the uplink resource configuration comprises the CE mode indicator, and

wherein a correspondence between a value for the repetition indicator and the number of repetitions indicated by the repetition indicator is determined based at least in part on the first maximum repetition indicator, the second maximum repetition indicator, and the CE mode indicator.

53. The method of claim 29, wherein the set of parameters of the uplink resource configuration comprises a feature support indication indicating support for one or more of: an enhanced transport block size (TBS), a modulation and coding scheme (MCS), an enhanced bandwidth, sub-physical resource block (PRB) allocation, or flexible resource allocation for the uplink communications in the idle mode, and wherein a set of fields of a downlink control information message transmitted while the UE is in the idle mode is interpreted based at least in part on the feature support indication.

54. The method of claim 53, further comprising:

receiving a capability message comprising a feature capability indication of UE capability support for the enhanced TBS, the MCS, the enhanced bandwidth, the sub-PRB allocation, or the flexible resource allocation for the uplink communications in the idle mode, wherein the feature support indication is based at least in part on the feature capability indication.

55. The method of claim 29, wherein the uplink resource configuration is received in a radio resource control (RRC) message.

56. The method of claim 29, wherein the first uplink transmission is transmitted in a physical uplink shared channel (PUSCH).

57. An apparatus for wireless communications at a user equipment (UE), comprising:

a processor,

memory coupled with the processor; and

instructions stored in the memory and executable by the processor to cause the apparatus to execute the method of any one of claims 1 to 28.

58. An apparatus for wireless communications at a base station, comprising:

a processor,

memory coupled with the processor; and

instructions stored in the memory and executable by the processor to cause the apparatus to execute the method of any one of claims 29 to 56.