CLAIMS

1. A method for wireless communication, comprising:

determining, by a user equipment (UE), a failure associated with reception, by a base station, of an initial transmission of a random access message transmitted by the UE in a two-step random access procedure; and

transmitting, by the UE to the base station and based on determining the failure, a retransmission of at least a portion of the random access message,

wherein the retransmission is transmitted on a different beam than the initial transmission, and a switch to the different beam is based on a response message.

2. The method of claim 1, wherein the retransmission is a repeat of the random access message.

3. The method of claim 1, further comprising receiving, from the base station and in response to the initial transmission, an indication of beam management information including beam management signaling for beam switching or beam refining.

4. The method of claim 3, wherein the indication of beam management information is part of downlink control information received from the base station.

5. The method of claim 3, wherein the indication further specifies the portion of the random access message to retransmit as including at least one of a preamble portion of the random access message and/or a payload portion of the random access message.

6. The method of claim 3, wherein the indication further specifies a first beam for retransmission of a preamble portion of the random access message and a second beam for retransmission of a payload portion of the random access message.

7. The method of claim 1, wherein the retransmission of the portion of the random access message comprises an indication of the retransmission type by the UE.

8. The method of claim 7, wherein the indication of the retransmission type comprises configuring at least one of a different preamble sequence than that used for the initial transmission, a different occasion than that used for the initial transmission, a different resource allocation or modulation and coding scheme (MCS) than that used for the initial transmission, a different combination of sequences and/or cyclic shifts used by demodulation reference signals than that used for the initial transmission, a different transmission gap between a preamble portion and a payload portion than that used for the initial transmission, or an inclusion of a bit in the payload portion of the retransmission that indicates retransmission and not new data transmission.

9. The method of claim 7, further comprising determining a mechanism for including the indication and the configuration of the retransmission based on at least one of broadcast signaling or dynamic signaling from the base station.

10. The method of claim 1, further comprising monitoring for a response message from the base station to the initial transmission of the random access message, as defined in the two-step random access procedure, wherein determining the failure comprises determining that the response message is not received within a period of time after the initial transmission.

11. The method of claim 1, wherein the random access message includes a preamble, a payload including a demodulation reference signal and physical uplink shared channel, and a configurable transmission gap.

12. A method for wireless communication, comprising:

receiving, from a user equipment (UE), a random access message transmitted by the UE in a two-step random access procedure;

determining whether the random access message is an initial transmission or a retransmission of the random access message; and

decoding the random access message based on determining whether the random access message is the initial transmission or the retransmission.

13. The method of claim 12, wherein determining comprises determining that the random access message is the retransmission based on one or more parameters associated with the retransmission.

14. The method of claim 13, wherein decoding the random access message is based at least in part on combining the retransmission with the initial transmission and/or one or more other retransmissions of the random access message.

15. The method of claim 13, wherein the one or more parameters associated with the retransmission comprise at least one of a preamble sequence, a random access occasion, a resource allocation or modulation and coding scheme (MCS), a combination of sequences and/or cyclic shifts used for demodulation reference signals, a time duration of the transmission gap between a preamble portion and a payload portion, or an inclusion of a bit that indicates retransmission and not new data transmission.

16. The method of claim 13, further comprising transmitting a configuration of the one or more parameters to use in retransmitting the random access message.

17. The method of claim 16, wherein transmitting the configuration comprises transmitting a broadcast signal indicating the one or more parameters.

18. The method of claim 12, wherein the determining comprises determining that the random access message is the retransmission based at least in part on receiving the initial transmission and transmitting a response message to the initial transmission, wherein the response message indicates a beam to use in transmitting the retransmission.

19. The method of claim 18, wherein determining that the random access message is the retransmission is based at least in part on determining the beam and/or associated resources based on which the random access message is received.

20. The method of claim 18, wherein the response message indicates a first beam to use in retransmitting a preamble portion of the random access message and a second beam to use in retransmitting a payload portion of the random access message.

21. The method of claim 18, further comprising modifying, based at least in part on the retransmission, a receive beam of a base station receiving the random access message.

22. The method of claim 12, further comprising transmitting a response message to the initial transmission in the two-step random access procedure.

23. The method of claim 22, wherein the response message indicates feedback for receiving at least a portion of the initial transmission.

24. The method of claim 23, further comprising receiving the retransmission of the random access message based at least in part on the feedback.

25. An apparatus for wireless communication, comprising:

a transceiver;

a memory configured to store instructions; and

one or more processors communicatively coupled with the transceiver and the memory, wherein the one or more processors are configured to:

determine a failure associated with reception, by a base station, of an initial transmission of a random access message transmitted in a two-step random access procedure; and

transmit, to the base station and based on determining the failure, a retransmission of at least a portion of the random access message, wherein the one or more processors are configured to transmit the retransmission on a different beam than the initial transmission, and a switch to the different beam is based on a response message.

26. The apparatus of claim 25, wherein the retransmission is a repeat of the random access message.

27. The apparatus of claim 25, wherein the one or more processors are further configured to receive, from the base station and in response to the initial transmission, an indication of beam management information including beam management signaling for beam switching or beam refining.

28. The apparatus of claim 27, wherein the indication of beam management information is part of downlink control information received from the base station.

29. The apparatus of claim 27, wherein the indication further specifies the portion of the random access message to retransmit as including at least one of a preamble portion of the random access message and/or a payload portion of the random access message.

30. The apparatus of claim 27, wherein the indication further specifies a first beam for retransmission of a preamble portion of the random access message and a second beam for retransmission of a payload portion of the random access message.

31. The apparatus of claim 25, wherein the retransmission of the portion of the random access message comprises an indication of the retransmission type.

32. The apparatus of claim 31, wherein the indication of the retransmission type comprises configuring at least one of a different preamble sequence than that used for the initial transmission, a different occasion than that used for the initial transmission, a different resource allocation or modulation and coding scheme (MCS) than that used for the initial transmission, a different combination of sequences and/or cyclic shifts used by demodulation reference signals than that used for the initial transmission, a different transmission gap between a preamble portion and a payload portion than that used for the initial transmission, or an inclusion of a bit in the payload portion of the retransmission that indicates retransmission and not new data transmission.

33. The apparatus of claim 31, wherein the one or more processors are further configured to determine a mechanism for including the indication and the configuration of the

retransmission based on at least one of broadcast signaling or dynamic signaling from the base station.

34. The apparatus of claim 25, wherein the one or more processors are further configured to monitor for a response message from the base station to the initial transmission of the random access message, as defined in the two-step random access procedure, wherein the one or more processors are configured to determine the failure at least in part by determining that the response message is not received within a period of time after the initial transmission.

35. The apparatus of claim 25, wherein the random access message includes a preamble, a payload including a demodulation reference signal and physical uplink shared channel, and a configurable transmission gap.

36. An apparatus for wireless communication, comprising:

a transceiver;

a memory configured to store instructions; and

one or more processors communicatively coupled with the transceiver and the memory, wherein the one or more processors are configured to:

receive, from a user equipment (UE), a random access message transmitted by the UE in a two-step random access procedure;

determine whether the random access message is an initial transmission or a retransmission of the random access message; and

decode the random access message based on determining whether the random access message is the initial transmission or the retransmission.

37. The apparatus of claim 36, wherein the one or more processors are configured to determine that the random access message is the retransmission based on one or more parameters associated with the retransmission.

38. The apparatus of claim 37, wherein the one or more processors are further configured to decode the random access message at least in part by combining the retransmission

with the initial transmission and/or one or more other retransmissions of the random access message.

39. The apparatus of claim 37, wherein the one or more parameters associated with the retransmission comprise at least one of a preamble sequence, a random access occasion, a resource allocation or modulation and coding scheme (MCS), a combination of sequences and/or cyclic shifts used for demodulation reference signals, a time duration of the transmission gap between a preamble portion and a payload portion, or an inclusion of a bit that indicates retransmission and not new data transmission.

40. The apparatus of claim 37, wherein the one or more processors are further configured to transmit a configuration of the one or more parameters to use in retransmitting the random access message.

41. The apparatus of claim 40, wherein the one or more processors are configured to transmit the configuration in a broadcast signal indicating the one or more parameters.

42. The apparatus of claim 36, wherein the one or more processors are configured to determine that the random access message is the retransmission based at least in part on receiving the initial transmission and transmitting a response message to the initial transmission, wherein the response message indicates a beam to use in transmitting the retransmission.

43. The apparatus of claim 42, wherein the one or more processors are configured to determine that the random access message is the retransmission based at least in part on determining the beam and/or associated resources based on which the random access message is received.

44. The apparatus of claim 42, wherein the response message indicates a first beam to use in retransmitting a preamble portion of the random access message and a second beam to use in retransmitting a payload portion of the random access message.

45. The apparatus of claim 42, wherein the one or more processors are further configured to modify, based at least in part on the retransmission, a receive beam of a base station receiving the random access message.

46. The apparatus of claim 36, wherein the one or more processors are further configured to transmit a response message to the initial transmission in the two-step random access procedure.

47. The apparatus of claim 46, wherein the response message indicates feedback for receiving at least a portion of the initial transmission.

48. The apparatus of claim 47, wherein the one or more processors are further configured to receive the retransmission of the random access message based at least in part on the feedback.

49. An apparatus for wireless communication, comprising:

means for determining a failure associated with reception, by a base station, of an initial transmission of a random access message transmitted in a two-step random access procedure; and

means for transmitting, to the base station and based on determining the failure, a retransmission of at least a portion of the random access message,

wherein the means for transmitting transmits the retransmission on a different beam than the initial transmission, and

a switch to the different beam is based on a response message.

50. The apparatus of claim 49, wherein the retransmission is a repeat of the random access message.

51. An apparatus for wireless communication, comprising:

means for receiving, from a user equipment (UE), a random access message transmitted by the UE in a two-step random access procedure;

means for determining whether the random access message is an initial transmission or a retransmission of the random access message; and

means for decoding the random access message based on determining whether the random access message is the initial transmission or the retransmission.

52. The apparatus of claim 51, wherein the means for determining determines that the random access message is the retransmission based on one or more parameters associated with the retransmission.

53. The apparatus of claim 52, wherein the means for decoding decodes the random access message based at least in part on combining the retransmission with the initial transmission and/or one or more other retransmissions of the random access message.

54. A computer-readable medium, comprising code executable by one or more processors for wireless communications, the code comprising code for:

determining, by a user equipment (UE), a failure associated with reception, by a base station, of an initial transmission of a random access message transmitted by the UE in a two-step random access procedure; and

transmitting, by the UE to the base station and based on determining the failure, a retransmission of at least a portion of the random access message,

wherein the code for transmitting transmits the retransmission on a different beam than the initial transmission, and a switch to the different beam is based on a response message.

55. The computer-readable medium of claim 54, wherein the retransmission is a repeat of the random access message.

56. A computer-readable medium, comprising code executable by one or more processors for wireless communications, the code comprising code for:

receiving, from a user equipment (UE), a random access message transmitted by the UE in a two-step random access procedure;

determining whether the random access message is an initial transmission or a retransmission of the random access message; and

decoding the random access message based on determining whether the random access message is the initial transmission or the retransmission.

57. The computer-readable medium of claim 56, wherein the code for determining determines that the random access message is the retransmission based on one or more parameters associated with the retransmission.

58. The computer-readable medium of claim 57, wherein the code for decoding decodes the random access message based at least in part on combining the retransmission with the initial transmission and/or one or more other retransmissions of the random access message.