CLAIMS

1. A method used in a wireless communication system, comprising:

determining a pairing between one or more uplink carriers and one or more downlink carriers, the one or more uplink carriers and the one or more downlink carriers comprising at least three carriers; and

exchanging control information on one or more of the carriers based on the pairing or an anchor carrier designation.

2. The method of claim 1, wherein the determining the pairing comprises deciding the pairing between the one or more uplink carriers and the one or more downlink carriers.

3. The method of claim 1, wherein the determining the pairing comprises identifying the pairing between the one or more uplink carriers and the one or more downlink carriers from broadcasted system information or dedicated signaling.

4. The method of claim 1, wherein when based on the pairing, the exchanging the control information comprises exchanging on all of the one or more uplink carriers the control information for the one or more downlink carriers to which the one or more uplink carriers are paired.

5. The method of claim 1, wherein when based on the pairing, the exchanging the control information comprises exchanging on all of the one or more downlink carriers the control information for the one or more uplink carriers to which the one or more downlink carriers are paired.

6. The method of claim 1, wherein when an anchor carrier is designated for uplink, the exchanging the control information comprises exchanging on the designated uplink

anchor carrier all the control information for the one or more downlink carriers to which the one or more uplink carriers are paired.

7. The method of claim 6, wherein the designated uplink anchor carrier is not paired with the one or more downlink carriers to which one or more other uplink carriers are paired.

8. The method of claim 6, wherein the designated uplink anchor carrier is one of the one or more uplink carriers.

9. The method of claim 1, wherein when an anchor carrier is designated for downlink, the exchanging the control information comprises exchanging on the designated downlink anchor carrier all the control information for the one or more uplink carriers to which the one or more downlink carriers are paired.

10. The method of claim 9, wherein the designated downlink anchor carrier is not paired with the one or more uplink carriers to which one or more other downlink carriers are paired.

11. The method of claim 9, wherein the designated downlink anchor carrier is one of the one or more downlink carriers.

12. The method of claim 1, wherein the control information comprises at least one of channel quality indication feedback, hybrid automatic repeat request feedback, downlink grants, or uplink grants.

13. The method of claim 1, wherein the control information is exchanged within data space of the carriers.

14. The method of claim 1, wherein at least one of the at least three paired carriers have at least one of a disjoint frequency allocation or an asymmetric bandwidth as compared to the other of the at least three paired carriers.

15. The method of claim 1, wherein:

determining the pairing comprises determining a plurality of pairings for all available downlink carriers and uplink carriers; and

at least one of said all the downlink carriers and the uplink carriers have at least one of a disjoint frequency allocation or an asymmetric bandwidth as compared to the other of said all the downlink carriers and the uplink carriers.

16. An apparatus operable in a wireless communication system, comprising:

means for determining a pairing between one or more uplink carriers and one or more downlink carriers, the one or more uplink carriers and the one or more downlink carriers comprising at least three carriers; and

means for exchanging control information on one or more of the carriers based on the pairing or an anchor carrier designation.

17. The apparatus of claim 16, wherein the means for determining the pairing decides the pairing between the one or more uplink carriers and the one or more downlink carriers.

18. The apparatus of claim 16, wherein the means for determining the pairing identifies the pairing between the one or more uplink carriers and the one or more downlink carriers from broadcasted system information or dedicated signaling.

19. The apparatus of claim 16, wherein when based on the pairing, the means for exchanging the control information exchanges on all of the one or more uplink carriers

the control information for the one or more downlink carriers to which the one or more uplink carriers are paired.

20. The apparatus of claim 16, wherein when based on the pairing, the means for exchanging the control information exchanges on all of the one or more downlink carriers the control information for the one or more uplink carriers to which the one or more downlink carriers are paired.

21. The apparatus of claim 16, wherein when an anchor carrier is designated for uplink, the means for exchanging the control information exchanges on the designated uplink anchor carrier all the control information for the one or more downlink carriers to which the one or more uplink carriers are paired.

22. The apparatus of claim 21, wherein the designated uplink anchor carrier is not paired with the one or more downlink carriers to which one or more other uplink carriers are paired.

23. The apparatus of claim 21, wherein the designated uplink anchor carrier is one of the one or more uplink carriers.

24. The apparatus of claim 16, wherein when an anchor carrier is designated for downlink, the means for exchanging the control information exchanges on the designated downlink anchor carrier all the control information for the one or more uplink carriers to which the one or more downlink carriers are paired.

25. The apparatus of claim 24, wherein the designated downlink anchor carrier is not paired with the one or more uplink carriers to which one or more other downlink carriers are paired.

26. The apparatus of claim 24, wherein the designated downlink anchor carrier is one of the one or more downlink carriers.

27. The apparatus of claim 16, wherein the control information comprises at least one of channel quality indication feedback, hybrid automatic repeat request feedback, downlink grants, or uplink grants.

28. The apparatus of claim 16, wherein the control information is exchanged within data space of the carriers.

29. The apparatus of claim 16, wherein at least one of the at least three paired carriers have at least one of a disjoint frequency allocation or an asymmetric bandwidth as compared to the other of the at least three paired carriers.

30. The apparatus of claim 16, wherein:

the means for determining the pairing determines a plurality of pairings for all available downlink carriers and uplink carriers; and

at least one of said all the downlink carriers and the uplink carriers have at least one of a disjoint frequency allocation or an asymmetric bandwidth as compared to the other of said all the downlink carriers and the uplink carriers.

31. An apparatus operable in a wireless communication system, comprising:

a processing system configured to:

determine a pairing between one or more uplink carriers and one or more downlink carriers, the one or more uplink carriers and the one or more downlink carriers comprising at least three carriers; and

exchange control information on one or more of the carriers based on the pairing or an anchor carrier designation.

32. The apparatus of claim 31, wherein to determine the pairing, the processing system is configured to decide the pairing between the one or more uplink carriers and the one or more downlink carriers.

33. The apparatus of claim 31, wherein to determine the pairing, the processing system is configured to identify the pairing between the one or more uplink carriers and the one or more downlink carriers from broadcasted system information or dedicated signaling.

34. The apparatus of claim 31, wherein when based on the pairing, the processing system is configured to exchange on all of the one or more uplink carriers the control information for the one or more downlink carriers to which the one or more uplink carriers are paired.

35. The apparatus of claim 31, wherein when based on the pairing, the processing system is configured to exchange on all of the one or more downlink carriers the control information for the one or more uplink carriers to which the one or more downlink carriers are paired.

36. The apparatus of claim 31, wherein when an anchor carrier is designated for uplink, the processing system is configured to exchange on the designated uplink anchor carrier all the control information for the one or more downlink carriers to which the one or more uplink carriers are paired.

37. The apparatus of claim 36, wherein the designated uplink anchor carrier is not paired with the one or more downlink carriers to which one or more other uplink carriers are paired.

38. The apparatus of claim 36, wherein the designated uplink anchor carrier is one of the one or more uplink carriers.

39. The apparatus of claim 31, wherein when an anchor carrier is designated for downlink, the processing system is configured to exchange on the designated downlink anchor carrier all the control information for the one or more uplink carriers to which the one or more downlink carriers are paired.

40. The apparatus of claim 39, wherein the designated downlink anchor carrier is not paired with the one or more uplink carriers to which one or more other downlink carriers are paired.

41. The apparatus of claim 39, wherein the designated downlink anchor carrier is one of the one or more downlink carriers.

42. The apparatus of claim 31, wherein the control information comprises at least one of channel quality indication feedback, hybrid automatic repeat request feedback, downlink grants, or uplink grants.

43. The apparatus of claim 31, wherein the control information is exchanged within data space of the carriers.

44. The apparatus of claim 31, wherein at least one of the at least three paired carriers have at least one of a disjoint frequency allocation or an asymmetric bandwidth as compared to the other of the at least three paired carriers.

45. The apparatus of claim 31, wherein:

to determining the pairing, the processing system is configured to determine a plurality of pairings for all available downlink carriers and uplink carriers; and

at least one of said all the downlink carriers and the uplink carriers have at least one of a disjoint frequency allocation or an asymmetric bandwidth as compared to the other of said all the downlink carriers and the uplink carriers.

46. A computer program product, comprising:

a computer-readable medium, comprising:

code for determining a pairing between one or more uplink carriers and one or more downlink carriers, the one or more uplink carriers and the one or more downlink carriers comprising at least three carriers; and

code for exchanging control information on one or more of the carriers based on the pairing or an anchor carrier designation.

47. The computer program product of claim 46, wherein the code for determining the pairing comprises code for deciding the pairing between the one or more uplink carriers and the one or more downlink carriers.

48. The computer program product of claim 46, wherein the code for determining the pairing comprises code for identifying the pairing between the one or more uplink carriers and the one or more downlink carriers from broadcasted system information or dedicated signaling.

49. The computer program product of claim 46, wherein when based on the pairing, the code for exchanging the control information comprises code for exchanging on all of the one or more uplink carriers the control information for the one or more downlink carriers to which the one or more uplink carriers are paired.

50. The computer program product of claim 46, wherein when based on the pairing, the code for exchanging the control information comprises code for exchanging on all of the

one or more downlink carriers the control information for the one or more uplink carriers to which the one or more downlink carriers are paired.

51. The computer program product of claim 46, wherein when an anchor carrier is designated for uplink, the code for exchanging the control information comprises code for exchanging on the designated uplink anchor carrier all the control information for the one or more downlink carriers to which the one or more uplink carriers are paired.

52. The computer program product of claim 51, wherein the designated uplink anchor carrier is not paired with the one or more downlink carriers to which one or more other uplink carriers are paired.

53. The computer program product of claim 51, wherein the designated uplink anchor carrier is one of the one or more uplink carriers.

54. The computer program product of claim 46, wherein when an anchor carrier is designated for downlink, the code for exchanging the control information comprises code for exchanging on the designated downlink anchor carrier all the control information for the one or more uplink carriers to which the one or more downlink carriers are paired.

55. The computer program product of claim 54, wherein the designated downlink anchor carrier is not paired with the one or more uplink carriers to which one or more other downlink carriers are paired.

56. The computer program product of claim 54, wherein the designated downlink anchor carrier is one of the one or more downlink carriers.

57. The computer program product of claim 46, wherein the control information comprises at least one of channel quality indication feedback, hybrid automatic repeat request feedback, downlink grants, or uplink grants.

58. The computer program product of claim 46, wherein the control information is exchanged within data space of the carriers.

59. The computer program product of claim 46, wherein at least one of the at least three paired carriers have at least one of a disjoint frequency allocation or an asymmetric bandwidth as compared to the other of the at least three paired carriers.

60. The computer program product of claim 46, wherein:

the code for determining the pairing comprises code for determining a plurality of pairings for all available downlink carriers and uplink carriers; and

at least one of said all the downlink carriers and the uplink carriers have at least one of a disjoint frequency allocation or an asymmetric bandwidth as compared to the other of said all the downlink carriers and the uplink carriers.

CLAIMS

1. A method used in a wireless communication system, comprising:

receiving information communicated through radio resource control signaling that indicates a configuration of one or more uplink carriers and one or more downlink carriers, the one or more uplink carriers and the one or more downlink carriers comprising at least three carriers;

using a first paired carrier for exchanging first control information for a first carrier of the one or more uplink carriers and the one or more downlink carriers; and

using, based at least in part on the information communicated through radio resource control signaling, a second paired carrier or a designated anchor carrier for exchanging second control information for a second carrier of the one or more uplink carriers and the one or more downlink carriers,

wherein the first carrier comprises an uplink or downlink carrier of a first carrier pairing and the second carrier comprises an uplink or downlink carrier of a second carrier pairing.

2. The method of claim 1, wherein the second control information comprises downlink control information, wherein using the second paired carrier or the designated anchor carrier comprises using the second paired carrier for exchanging the downlink control information, and wherein the method further comprises using the designated anchor carrier for exchanging uplink control information for the second carrier of the one or more uplink carriers and the one or more downlink carriers.

3. The method of claim 1, wherein the second control information comprises downlink control information, wherein using the second paired carrier or the designated anchor carrier comprises using the designated anchor carrier for exchanging the downlink control information, and wherein the method further comprises using the designated anchor carrier for exchanging uplink control information for the second carrier of the one or more uplink carriers and the one or more downlink carriers.

4. The method of claim 1, wherein the first and second control information each comprises at least one of channel quality indication feedback, hybrid automatic repeat request feedback, downlink grants, or uplink grants.

5. The method of claim 1, wherein the second control information is exchanged within data space of the carriers.

6. The method of claim 1, wherein at least one of the one or more uplink carriers and the one or more downlink carriers have at least one of a disjoint frequency allocation or an asymmetric bandwidth as compared to the other of the one or more uplink carriers and the one or more downlink carriers.

7. The method of claim 1, further comprising:

identifying one or more pairings for all available downlink carriers and uplink carriers based at least in part on the received information communicated through radio resource control signaling, wherein at least one of the available downlink or uplink carriers have at least one of a disjoint frequency allocation or an asymmetric bandwidth as compared to another of the available downlink or uplink carriers.

8. The method of claim **1**, further comprising:

determining, for an uplink transmission on the second carrier, a downlink resource for hybrid automatic repeat request feedback, the downlink resource being on a carrier on which a grant for the uplink transmission was sent.

9. An apparatus operable in a wireless communication system, comprising:

means for receiving information communicated through radio resource control signaling that indicates a configuration of one or more uplink carriers and one or more downlink carriers, the one or more uplink carriers and the one or more downlink carriers comprising at least three carriers;

means for using a first paired carrier for exchanging first control information for a first carrier of the one or more uplink carriers and the one or more downlink carriers; and

means for using, based at least in part on the information communicated through radio resource control signaling, a second paired carrier or a designated anchor carrier for exchanging second control information for a second carrier of the one or more uplink carriers and the one or more downlink carriers,

wherein the first carrier comprises an uplink or downlink carrier of a first carrier pairing and the second carrier comprises an uplink carrier or downlink carrier of a second carrier pairing.

10. The apparatus of claim **9**, wherein the second control information comprises downlink control information, wherein the means for using the second paired carrier or the designated anchor carrier comprises means for using the second paired carrier for exchanging the downlink control infor-

mation, and wherein the apparatus further comprises means for using the designated anchor carrier for exchanging uplink control information for the second carrier of the one or more uplink carriers and the one or more downlink carriers.

11. The apparatus of claim **9**, wherein the second control information comprises downlink control information, wherein the means for using the second paired carrier or the designated anchor carrier comprises means for using the designated anchor carrier for exchanging the downlink control information, and wherein the apparatus further comprises means for using the designated anchor carrier for exchanging uplink control information for the second carrier of the one or more uplink carriers and the one or more downlink carriers.

12. The apparatus of claim **9**, wherein the first and second control information each comprises at least one of channel quality indication feedback, hybrid automatic repeat request feedback, downlink grants, or uplink grants.

13. The apparatus of claim **9**, wherein the second control information is exchanged within data space of the carriers.

14. The apparatus of claim **9**, wherein at least one of the one or more uplink carriers and the one or more downlink carriers have at least one of a disjoint frequency allocation or an asymmetric bandwidth as compared to the other of the one or more uplink carriers and the one or more downlink carriers.

15. The apparatus of claim **9**, further comprising:

means for identifying one or more pairings for all available downlink carriers and uplink carriers based at least in part on the received information communicated through radio resource control signaling, wherein at least one of the available downlink or uplink carriers have at least one of a disjoint frequency allocation or an asymmetric bandwidth as compared to another of the available downlink or uplink carriers.

16. The apparatus of claim **9**, further comprising:

means for determining, for an uplink transmission on the second carrier, a downlink resource for hybrid automatic repeat request feedback, the downlink resource being on a carrier on which a grant for the uplink transmission was sent.

17. An apparatus operable in a wireless communication system, comprising:

one or more processors configured to:

receive information communicated through a radio resource control signaling that indicates a configuration of one or more uplink carriers and one or more downlink carriers, the one or more uplink carriers and the one or more downlink carriers comprising at least three carriers;

use, a first paired carrier for exchanging first control information for a first carrier of the one or more uplink carriers and the one or more downlink carriers; and

use, based at least in part on the information communicated through radio resource control signaling, a second paired carrier or a designated anchor carrier for exchanging second control information for a second carrier of the one or more uplink carriers and the one or more downlink carriers,

wherein the first carrier comprises an uplink or downlink carrier of a first carrier pairing and the second carrier comprises an uplink or downlink carrier of a second carrier pairing.

18. The apparatus of claim **17**, wherein the second control information comprises downlink control information, wherein using the second paired carrier or the designated anchor carrier comprises using the second paired carrier for exchanging the downlink control information, and wherein

the one or more processors are configured to use the designated anchor carrier for exchanging uplink control information for the second carrier of the one or more uplink carriers and the one or more downlink carriers.

19. The apparatus of claim **17**, wherein the second control information comprises downlink control information, wherein using the second paired carrier or the designated anchor carrier comprises using the designated anchor carrier for exchanging the downlink control information, and wherein the one or more processors are configured to use the designated anchor carrier for exchanging uplink control information for the second carrier of the one or more uplink carriers and the one or more downlink carriers.

20. The apparatus of claim **17**, wherein the first and second control information each comprises at least one of channel quality indication feedback, hybrid automatic repeat request feedback, downlink grants, or uplink grants.

21. The apparatus of claim **17**, wherein the second control information is exchanged within data space of the carriers.

22. The apparatus of claim **17**, wherein at least one of the one or more uplink carriers and the one or more downlink carriers have at least one of a disjoint frequency allocation or an asymmetric bandwidth as compared to the other of the one or more uplink carriers and the one or more downlink carriers.

23. The apparatus of claim **17**, further comprising:

one or more processors configured to:

identify one or more pairings for all available downlink carriers and uplink carriers based at least in part on the received information communicated through radio resource control signaling; and

at least one of the available downlink or uplink carriers have at least one of a disjoint frequency allocation or an asymmetric bandwidth as compared to another of the available downlink or uplink carriers.

24. The apparatus of claim **17**, wherein the one or more processors are further configured to:

determine, for an uplink transmission on the second carrier, a downlink resource for hybrid automatic repeat request feedback, the downlink resource being on a carrier on which a grant for the uplink transmission was sent.

25. A computer program product comprising

a non-transitory computer-readable medium, the non-transitory computer-readable medium comprising:

code for receiving information communicated through radio resource control signaling that indicates a configuration of one or more uplink carriers and one or more downlink carriers, the one or more uplink carriers and the one or more downlink carriers comprising at least three carriers;

code for using a first paired carrier for exchanging first control information for a first carrier of the one or more uplink carriers and the one or more downlink carriers; and

code for using, based at least in part on the information communicated through radio resource control signaling, a second paired carrier or a designated anchor carrier for exchanging second control information for a second carrier of the one or more uplink carriers and the one or more downlink carriers,

wherein the first carrier comprises an uplink or downlink carrier of a first carrier pairing and the second carrier comprises an uplink or downlink carrier of a second carrier pairing.

26. The computer program product of claim **25**, wherein the second control information comprises downlink control information, wherein using the second paired carrier or the

designated anchor carrier comprises using the second paired carrier for exchanging the downlink control information, and wherein the non-transitory computer-readable medium further comprises code for using the designated anchor carrier for exchanging uplink control information for the second carrier of the one or more uplink carriers and the one or more downlink carriers.

27. The computer program product of claim **25**, wherein the second control information comprises downlink control information, wherein using the second paired carrier or the designated anchor carrier comprises using the designated anchor carrier for exchanging the downlink control information, and wherein the non-transitory computer-readable medium comprises code for using the designated anchor carrier for exchanging uplink control information for the second carrier of the one or more uplink carriers and the one or more downlink carriers.

28. The computer program product of claim **25**, wherein the first and second control information each comprises at least one of channel quality indication feedback, hybrid automatic repeat request feedback, downlink grants, or uplink grants.

29. The computer program product of claim **25**, wherein the second control information is exchanged within data space of the carriers.

30. The computer program product of claim **25**, wherein at least one of the one or more uplink carriers and the one or more downlink carriers have at least one of a disjoint frequency allocation or an asymmetric bandwidth as compared to the other of the one or more uplink carriers and the one or more downlink carriers.

31. The computer program product of claim **25**, further comprising:

code for identifying one or more pairings for all available downlink carriers and uplink carriers based at least in part on the received information communicated through radio resource control signaling, wherein at least one of the available downlink or uplink carriers have at least one of a disjoint frequency allocation or an asymmetric bandwidth as compared to another of the available downlink or uplink carriers.

32. The computer program product of claim **25**, wherein the non-transitory computer-readable medium further comprises:

code for determining, for an uplink transmission on the second carrier, a downlink resource for hybrid automatic repeat request feedback, the downlink resource being on a carrier on which a grant for the uplink transmission was sent.