

CLAIMS

WHAT IS CLAIMED IS:

1. A method of wireless communication of a base station, comprising:
transmitting downlink information to at least one user equipment (UE) using a plurality of downlink transmission time intervals (TTIs) within a subframe or slot; and
receiving uplink information from the at least one UE using at least one uplink region within the subframe or slot.
2. The method of claim 1, wherein the subframe or slot comprises equally sized TTIs.
3. The method of claim 1, wherein the subframe or slot comprises unequally sized TTIs.
4. The method of claim 1, wherein the uplink information comprises one or more acknowledgments to at least a subset of the plurality of downlink TTIs.
5. The method of claim 4, wherein resources for the one or more acknowledgments are implicitly allocated within the at least one uplink region based on a pattern of the plurality of downlink TTIs.
6. The method of claim 1, wherein the at least one uplink region comprises an uplink control block, wherein each of the plurality of downlink TTIs comprises a downlink control block.
7. The method of claim 6, wherein the uplink control block comprises a plurality of symbols, each of the plurality of symbols corresponding to a UE scheduled in the subframe or slot, wherein each of the plurality of symbols in the uplink control block is smaller than a symbol in a downlink data block of a downlink TTI.
8. The method of claim 7, wherein a number of the plurality of symbols is specified through higher layer signaling.

9. The method of claim 7, wherein a number of the plurality of symbols is specified in at least one downlink control block of the plurality of downlink TTIs.
10. The method of claim 6, wherein the at least one uplink region comprises two or more uplink TTIs.
11. The method of claim 10, wherein the downlink control block of the subframe or slot comprises a plurality of symbols, each of the plurality of symbols corresponding to an uplink TTI of the two or more uplink TTIs, wherein each of the plurality of symbols in the downlink control block of the subframe or slot is smaller than a symbol in a downlink data block of the subframe or slot.
12. The method of claim 6, wherein the downlink control block of a earliest downlink TTI of the plurality of downlink TTIs is synchronized across bases stations, wherein downlink control block of the earliest downlink TTI comprise control information related to a subsequent downlink TTI of the plurality of downlink TTIs.
13. The method of claim 6, wherein the uplink control block of the at least one uplink region is synchronized across bases stations.
14. The method of claim 6, wherein the downlink control block of each downlink TTI specifies resource allocation on the downlink TTI.
15. The method of claim 6, wherein the downlink control block of a downlink TTI indicates a number of combined TTIs within the subframe or slot or a size of each combined TTI.
16. The method of claim 1, wherein a downlink TTI corresponding to a first UE is placed closer to the at least one uplink region than a downlink TTI corresponding to a second UE, the first UE having a higher processing capability than the second UE.
17. A method of wireless communication of a user equipment (UE), comprising:

receiving downlink information from a base station using at least one downlink transmission time interval (TTI) within a subframe or slot, the subframe or slot comprising a plurality of downlink TTIs and at least one uplink region; and

transmitting uplink information to the base station using the at least one uplink region within the subframe or slot.

18. The method of claim 17, wherein the subframe or slot comprises equally sized TTIs.

19. The method of claim 17, wherein subframe or slot comprises unequally sized TTIs.

20. The method of claim 17, wherein the uplink information comprises an acknowledgment to the at least one downlink TTI.

21. The method of claim 20, wherein resource for the acknowledgment is implicitly allocated within the at least one uplink region based on a pattern of the plurality of downlink TTIs.

22. The method of claim 17, wherein the at least one uplink region comprises an uplink control block, wherein each of the plurality of downlink TTIs comprises a downlink control block.

23. The method of claim 22, wherein the uplink control block comprises a plurality of symbols, each of the plurality of symbols corresponding to a UE scheduled in the subframe or slot, wherein each of the plurality of symbols in the uplink control block is smaller than a symbol in a downlink data block of a downlink TTI.

24. The method of claim 23, wherein a number of the plurality of symbols is specified through higher layer signaling.

25. The method of claim 23, wherein a number of the plurality of symbols is specified in at least one downlink control block of the plurality of downlink TTIs.

26. The method of claim 22, wherein the at least one uplink region comprises two or more uplink TTIs.
27. The method of claim 26, wherein the downlink control block of the subframe or slot comprises a plurality of symbols, each of the plurality of symbols corresponding to an uplink TTI of the two or more uplink TTIs, wherein each of the plurality of symbols in the downlink control block of the subframe or slot is smaller than a symbol in a downlink data block of the subframe or slot.
28. The method of claim 22, wherein the downlink control block of a earliest downlink TTI of the plurality of downlink TTIs is synchronized across bases stations, wherein downlink control block of the earliest downlink TTI comprise control information related to a subsequent downlink TTI of the plurality of downlink TTIs.
29. The method of claim 22, wherein the uplink control block of the at least one uplink region is synchronized across bases stations.
30. The method of claim 22, wherein the downlink control block of each downlink TTI specifies resource allocation on the downlink TTI.
31. The method of claim 22, wherein the downlink control block of a downlink TTI indicates a number of combined TTIs within the subframe or slot or a size of each combined TTI.
32. The method of claim 17, wherein a downlink TTI corresponding to a first UE is placed closer to the at least one uplink region than a downlink TTI corresponding to a second UE, the first UE having a higher processing capability than the second UE.
33. An apparatus for wireless communication, the apparatus being a base station, comprising:
means for transmitting downlink information to at least one user equipment (UE) using a plurality of downlink transmission time intervals (TTIs) within a subframe or slot; and

means for receiving uplink information from the at least one UE using at least one uplink region within the subframe or slot.

34. The apparatus of claim 33, wherein the subframe or slot comprises equally sized TTIs.

35. The apparatus of claim 33, wherein the subframe or slot comprises unequally sized TTIs.

36. The apparatus of claim 33, wherein the uplink information comprises one or more acknowledgments to at least a subset of the plurality of downlink TTIs.

37. The apparatus of claim 36, wherein resources for the one or more acknowledgments are implicitly allocated within the at least one uplink region based on a pattern of the plurality of downlink TTIs.

38. The apparatus of claim 33, wherein the at least one uplink region comprises an uplink control block, wherein each of the plurality of downlink TTIs comprises a downlink control block.

39. The apparatus of claim 38, wherein the uplink control block comprises a plurality of symbols, each of the plurality of symbols corresponding to a UE scheduled in the subframe or slot, wherein each of the plurality of symbols in the uplink control block is smaller than a symbol in a downlink data block of a downlink TTI.

40. The apparatus of claim 39, wherein a number of the plurality of symbols is specified through higher layer signaling.

41. The apparatus of claim 39, wherein a number of the plurality of symbols is specified in at least one downlink control block of the plurality of downlink TTIs.

42. The apparatus of claim 38, wherein the at least one uplink region comprises two or more uplink TTIs.

43. The apparatus of claim 42, wherein the downlink control block of the subframe or slot comprises a plurality of symbols, each of the plurality of symbols corresponding to an uplink TTI of the two or more uplink TTIs, wherein each of the plurality of symbols in the downlink control block of the subframe or slot is smaller than a symbol in a downlink data block of the subframe or slot.

44. The apparatus of claim 38, wherein the downlink control block of a earliest downlink TTI of the plurality of downlink TTIs is synchronized across bases stations, wherein downlink control block of the earliest downlink TTI comprise control information related to a subsequent downlink TTI of the plurality of downlink TTIs.

45. The apparatus of claim 38, wherein the uplink control block of the at least one uplink region is synchronized across bases stations.

46. The apparatus of claim 38, wherein the downlink control block of each downlink TTI specifies resource allocation on the downlink TTI.

47. The apparatus of claim 38, wherein the downlink control block of a downlink TTI indicates a number of combined TTIs within the subframe or slot or a size of each combined TTI.

48. The apparatus of claim 33, wherein a downlink TTI corresponding to a first UE is placed closer to the at least one uplink region than a downlink TTI corresponding to a second UE, the first UE having a higher processing capability than the second UE.

49. An apparatus for wireless communication, the apparatus being a user equipment (UE), comprising:

means for receiving downlink information from a base station using at least one downlink transmission time interval (TTI) within a subframe or slot, the subframe or slot comprising a plurality of downlink TTIs and at least one uplink region; and

means for transmitting uplink information to the base station using the at least one uplink region within the subframe or slot.

50. The apparatus of claim 49, wherein the subframe or slot comprises equally sized TTIs.
51. The apparatus of claim 49, wherein subframe or slot comprises unequally sized TTIs.
52. The apparatus of claim 49, wherein the uplink information comprises an acknowledgment to the at least one downlink TTI.
53. The apparatus of claim 52, wherein resource for the acknowledgment is implicitly allocated within the at least one uplink region based on a pattern of the plurality of downlink TTIs.
54. The apparatus of claim 49, wherein the at least one uplink region comprises an uplink control block, wherein each of the plurality of downlink TTIs comprises a downlink control block.
55. The apparatus of claim 54, wherein the uplink control block comprises a plurality of symbols, each of the plurality of symbols corresponding to a UE scheduled in the subframe or slot, wherein each of the plurality of symbols in the uplink control block is smaller than a symbol in a downlink data block of a downlink TTI.
56. The apparatus of claim 55, wherein a number of the plurality of symbols is specified through higher layer signaling.
57. The apparatus of claim 55, wherein a number of the plurality of symbols is specified in at least one downlink control block of the plurality of downlink TTIs.
58. The apparatus of claim 54, wherein the at least one uplink region comprises two or more uplink TTIs.
59. The apparatus of claim 58, wherein the downlink control block of the subframe or slot comprises a plurality of symbols, each of the plurality of symbols corresponding to an uplink TTI of the two or more uplink TTIs, wherein each of the plurality of

symbols in the downlink control block of the subframe or slot is smaller than a symbol in a downlink data block of the subframe or slot.

60. The apparatus of claim 54, wherein the downlink control block of a earliest downlink TTI of the plurality of downlink TTIs is synchronized across bases stations, wherein downlink control block of the earliest downlink TTI comprise control information related to a subsequent downlink TTI of the plurality of downlink TTIs.

61. The apparatus of claim 54, wherein the uplink control block of the at least one uplink region is synchronized across bases stations.

62. The apparatus of claim 54, wherein the downlink control block of each downlink TTI specifies resource allocation on the downlink TTI.

63. The apparatus of claim 54, wherein the downlink control block of a downlink TTI indicates a number of combined TTIs within the subframe or slot or a size of each combined TTI.

64. The apparatus of claim 49, wherein a downlink TTI corresponding to a first UE is placed closer to the at least one uplink region than a downlink TTI corresponding to a second UE, the first UE having a higher processing capability than the second UE.

65. An apparatus for wireless communication, the apparatus being a base station, comprising:

a memory; and

at least one processor coupled to the memory and configured to:

transmit downlink information to at least one user equipment (UE) using a plurality of downlink transmission time intervals (TTIs) within a subframe or slot; and

receive uplink information from the at least one UE using at least one uplink region within the subframe or slot.

66. The apparatus of claim 65, wherein the subframe or slot comprises equally sized TTIs.

67. The apparatus of claim 65, wherein the subframe or slot comprises unequally sized TTIs.
68. The apparatus of claim 65, wherein the uplink information comprises one or more acknowledgments to at least a subset of the plurality of downlink TTIs.
69. The apparatus of claim 68, wherein resources for the one or more acknowledgments are implicitly allocated within the at least one uplink region based on a pattern of the plurality of downlink TTIs.
70. The apparatus of claim 65, wherein the at least one uplink region comprises an uplink control block, wherein each of the plurality of downlink TTIs comprises a downlink control block.
71. The apparatus of claim 70, wherein the uplink control block comprises a plurality of symbols, each of the plurality of symbols corresponding to a UE scheduled in the subframe or slot, wherein each of the plurality of symbols in the uplink control block is smaller than a symbol in a downlink data block of a downlink TTI.
72. The apparatus of claim 71, wherein a number of the plurality of symbols is specified through higher layer signaling.
73. The apparatus of claim 71, wherein a number of the plurality of symbols is specified in at least one downlink control block of the plurality of downlink TTIs.
74. The apparatus of claim 70, wherein the at least one uplink region comprises two or more uplink TTIs.
75. The apparatus of claim 74, wherein the downlink control block of the subframe or slot comprises a plurality of symbols, each of the plurality of symbols corresponding to an uplink TTI of the two or more uplink TTIs, wherein each of the plurality of symbols in the downlink control block of the subframe or slot is smaller than a symbol in a downlink data block of the subframe or slot.

76. The apparatus of claim 70, wherein the downlink control block of a earliest downlink TTI of the plurality of downlink TTIs is synchronized across bases stations, wherein downlink control block of the earliest downlink TTI comprise control information related to a subsequent downlink TTI of the plurality of downlink TTIs.

77. The apparatus of claim 70, wherein the uplink control block of the at least one uplink region is synchronized across bases stations.

78. The apparatus of claim 70, wherein the downlink control block of each downlink TTI specifies resource allocation on the downlink TTI.

79. The apparatus of claim 70, wherein the downlink control block of a downlink TTI indicates a number of combined TTIs within the subframe or slot or a size of each combined TTI.

80. The apparatus of claim 65, wherein a downlink TTI corresponding to a first UE is placed closer to the at least one uplink region than a downlink TTI corresponding to a second UE, the first UE having a higher processing capability than the second UE.

81. An apparatus for wireless communication, the apparatus being a user equipment (UE), comprising:

a memory; and

at least one processor coupled to the memory and configured to:

receive downlink information from a base station using at least one downlink transmission time interval (TTI) within a subframe or slot, the subframe or slot comprising a plurality of downlink TTIs and at least one uplink region; and

transmit uplink information to the base station using the at least one uplink region within the subframe or slot.

82. The apparatus of claim 81, wherein the subframe or slot comprises equally sized TTIs.

83. The apparatus of claim 81, wherein subframe or slot comprises unequally sized TTIs.

84. The apparatus of claim 81, wherein the uplink information comprises an acknowledgment to the at least one downlink TTI.

85. The apparatus of claim 84, wherein resource for the acknowledgment is implicitly allocated within the at least one uplink region based on a pattern of the plurality of downlink TTIs.

86. The apparatus of claim 81, wherein the at least one uplink region comprises an uplink control block, wherein each of the plurality of downlink TTIs comprises a downlink control block.

87. The apparatus of claim 86, wherein the uplink control block comprises a plurality of symbols, each of the plurality of symbols corresponding to a UE scheduled in the subframe or slot, wherein each of the plurality of symbols in the uplink control block is smaller than a symbol in a downlink data block of a downlink TTI.

88. The apparatus of claim 87, wherein a number of the plurality of symbols is specified through higher layer signaling.

89. The apparatus of claim 87, wherein a number of the plurality of symbols is specified in at least one downlink control block of the plurality of downlink TTIs.

90. The apparatus of claim 86, wherein the at least one uplink region comprises two or more uplink TTIs.

91. The apparatus of claim 90, wherein the downlink control block of the subframe or slot comprises a plurality of symbols, each of the plurality of symbols corresponding to an uplink TTI of the two or more uplink TTIs, wherein each of the plurality of symbols in the downlink control block of the subframe or slot is smaller than a symbol in a downlink data block of the subframe or slot.

92. The apparatus of claim 86, wherein the downlink control block of a earliest downlink TTI of the plurality of downlink TTIs is synchronized across bases stations,

wherein downlink control block of the earliest downlink TTI comprise control information related to a subsequent downlink TTI of the plurality of downlink TTIs.

93. The apparatus of claim 86, wherein the uplink control block of the at least one uplink region is synchronized across bases stations.

94. The apparatus of claim 86, wherein the downlink control block of each downlink TTI specifies resource allocation on the downlink TTI.

95. The apparatus of claim 86, wherein the downlink control block of a downlink TTI indicates a number of combined TTIs within the subframe or slot or a size of each combined TTI.

96. The apparatus of claim 81, wherein a downlink TTI corresponding to a first UE is placed closer to the at least one uplink region than a downlink TTI corresponding to a second UE, the first UE having a higher processing capability than the second UE.

97. A computer-readable medium storing computer executable code, comprising code to:

transmit downlink information to at least one user equipment (UE) using a plurality of downlink transmission time intervals (TTIs) within a subframe or slot; and

receive uplink information from the at least one UE using at least one uplink region within the subframe or slot.

98. A computer-readable medium storing computer executable code, comprising code to:

receive downlink information from a base station using at least one downlink transmission time interval (TTI) within a subframe or slot, the subframe or slot comprising a plurality of downlink TTIs and at least one uplink region; and

transmit uplink information to the base station using the at least one uplink region within the subframe or slot.