CLAIMS

1. A method implemented by a wireless transmit/receive unit (WTRU), the method comprising:

receiving a plurality of control information elements in a downlink control channel during a plurality of transmission time intervals (TTIs), at least one of the control information elements including downlink resource assignment information and downlink modulation and coding scheme information, and at least one of the control information elements including uplink resource assignment information;

processing a downlink shared channel based on the downlink resource assignment information and the downlink modulation and coding scheme information; and

processing and transmitting an uplink channel based on the uplink resource assignment information.

2. The method of claim 1 wherein at least one of the control information elements includes downlink redundancy version information.

3. The method of claim 1 wherein at least one of the control information elements includes downlink new data indicator information.

4. A wireless transmit/receive unit (WTRU) comprising:

circuitry configured to receive a plurality of control information elements in a downlink control channel during a plurality of transmission time intervals (TTIs), at least one of the control information elements including downlink resource assignment information and downlink modulation and coding scheme information, and at least one of the control information elements including uplink resource assignment information;

wherein the circuitry is further configured to process a downlink shared channel based on the downlink resource assignment information and the downlink

modulation and coding scheme information; and

wherein the circuitry is further configured to process and transmit an uplink channel based on the uplink resource assignment information.

5. The WTRU of claim 4 wherein at least one of the control information elements includes downlink redundancy version information.

6. The WTRU of claim 4 wherein at least one of the control information elements includes downlink new data indicator information.

7. An infrastructure node comprising:

circuitry configured to produce and transmit a plurality of control information elements for a downlink control channel during a plurality of transmission time intervals (TTIs), at least one of the control information elements including downlink resource assignment information and downlink modulation and coding scheme information for a wireless transmit/receive unit (WTRU), and at least one of the control information elements including uplink resource assignment information for the WTRU;

wherein the circuitry is further configured to transmit a downlink shared channel to the WTRU in accordance with the downlink resource assignment information and the downlink modulation and coding scheme information; and

wherein the circuitry is further configured to receive an uplink channel from the WTRU in response to the uplink resource assignment information.

8. The infrastructure node of claim 7 wherein at least one of the control information elements includes downlink redundancy version information.

9. The infrastructure node of claim 7 wherein at least one of the control information elements includes downlink new data indicator information.

Claims

1. A method implemented by a wireless transmit/receive unit (WTRU), the method comprising:

transmitting a combination of uplink control information and uplink data, via an uplink data channel, wherein the uplink control information comprises physical layer control information; and

transmitting the uplink control information, via an uplink control channel, on condition that the uplink data channel is not available for transmitting uplink data.

2. The method of claim 1, wherein transmitting a combination of uplink control information and uplink data comprises: utilizing an uplink resource assignment for the uplink data channel.

3. The method of claim 1, further comprising: receiving, via a downlink control channel, an uplink resource assignment for the uplink data channel.

4. The method of any of the claims 1-3, further comprising: transmitting a scheduling request via the uplink control channel.

5. The method of any of the claims 1-4, wherein the uplink control information comprises multiple different types of control information.

6. The method of any of the claims 1-5, wherein the physical layer control information comprises feedback information.

7. The method of any of the claims 1-6, wherein the physical layer control information comprises a channel quality indicator (CQI).

8. The method of any of the claims 1-7, wherein the physical layer control information comprises any of an acknowledgement and non-acknowledgement.

9. The method of any of the claims 1-8, wherein the combination of uplink control information and uplink data comprises the uplink control information multiplexed with the uplink data.

10. The method of any of the claims 1-6, wherein the physical layer control information comprises any of a channel quality indicator (CQI), an acknowledgement and a non-acknowledgement, and wherein the combination of uplink control information and uplink data comprises at least the CQI multiplexed with the uplink data.

11. A wireless transmit/receive unit (WTRU) comprising a transmitter, receiver and processor, wherein the transmitter is adapted to:

transmit a combination of uplink control information and uplink data via an uplink data channel, wherein the uplink control information comprises physical layer control information; and

transmit the uplink control information, via an uplink control channel, on condition that the uplink data channel is not available for transmitting uplink data.

12. The WTRU of claim 11, wherein the transmitter is adapted to utilize an uplink resource assignment for the uplink data channel to transmit the combination of uplink control information and uplink data.

13. The WTRU of claim 11, wherein the receiver is adapted to receive, via a downlink control channel, an uplink resource assignment for the uplink data channel.

14. The WTRU of any of the claims 11-13, wherein the transmitter is adapted to transmit a scheduling request via the uplink control channel.

15. The WTRU of any of the claims 11-14, wherein the uplink control information comprises multiple different types of control information.

16. The WTRU of any of the claims 11-15, wherein the uplink control information comprises feedback information.

17. The WTRU of any of the claims 11-16, wherein the physical layer control information comprises a channel quality indicator (CQI).

18. The WTRU of any of the claims 11-17, wherein the physical layer control information comprises any of an acknowledgement and non-acknowledgement.

19. The WTRU of any of the claims 11-18, wherein the combination of uplink control information and uplink data comprises the uplink control information multiplexed with the uplink data.

20. The WTRU of any of the claims 11-16, wherein the physical layer control information comprises any of a channel quality indicator (CQI), an acknowledgement and a non-acknowledgement, and wherein the combination of uplink control information and uplink data comprises at least the CQI multiplexed with the uplink data.

21. An infrastructure node comprising a transmitter and a receiver, wherein:

the receiver is adapted to receive, via an uplink data channel from a wireless transmit receive unit (WTRU), a combination of uplink control information and uplink data, wherein the uplink control information comprises physical layer control information; and

the receiver is adapted to receive the uplink control information from the WTRU, via an uplink control channel, on condition that the uplink data channel is not available for transmitting uplink data.

22. The infrastructure node of claim 21, wherein the receiver is adapted to receive the combination of uplink control information and uplink data on an uplink resource assignment for the uplink data channel.

23. The infrastructure node of any of the claims 21-22, further comprising a processor, wherein the processor is adapted to generate the uplink resource assignment, and wherein the transmitter is adapted to transmit the uplink resource assignment.

24. The infrastructure node of any of the claims 21-23, wherein the receiver is adapted to receive a scheduling request via an uplink control channel.

25. The infrastructure node of any of the claims 21-24, wherein the uplink control information comprises multiple different types of control information.

26. The infrastructure node of any of the claims 21-25, wherein the uplink control information comprises feedback information.

27. The infrastructure node of any of the claims 21-26, wherein the physical layer control information comprises a channel quality indicator (CQI).

28. The infrastructure node of any of the claims 21-27, wherein the physical layer control information comprises any of an acknowledgement and non-acknowledgement.

29. The infrastructure node of any of the claims 21-28, wherein the combination of uplink control information and uplink data comprises the uplink control information multiplexed with the uplink data.

30. The infrastructure node of any of the claims 21-26, wherein the physical layer control information comprises any of a channel quality indicator (CQI), an acknowledgement and a non-acknowledgement, and wherein the combination of uplink control information and uplink data comprises at least the CQI multiplexed with the uplink data.