

WHAT IS CLAIMED IS:

CLAIMS

1. A method of receiving a transmission from two or more wireless communication devices, the method comprising:

receiving a first preamble transmitted by a first wireless device;

simultaneously receiving a second preamble transmitted by a second wireless device;

receiving a first portion of the transmission in a first section of a bandwidth, the first portion transmitted by the first wireless device including a first data section; and

simultaneously receiving a second portion of the transmission in a second section of the bandwidth, the second section of the bandwidth not overlapping with the first section of the bandwidth, the second portion transmitted by the second wireless device, the second portion including a second data section.

2. The method of claim 1, wherein the first preamble comprises a first section transmitted using a first format is interpretable by wireless devices having a first set of capabilities, and further comprises a second section transmitted using a second format that is interpretable by wireless devices having a second set of capabilities, and wherein the second preamble comprises a third section transmitted using the first format that is interpretable by wireless devices having the first set of capabilities, and further comprises a fourth section transmitted using the second format that is interpretable by wireless devices having the second set of capabilities.

3. The method of claim 2, wherein the first section of the first preamble and the third section of the second preamble each include a training field of a first type used for automatic gain control, a training field of a second type used for accurate frequency offset estimation, time synchronization, and channel estimation, and a signal field.

4. The method of claim 2, wherein the second section of the first preamble and the fourth section of the second preamble each include one or more training fields of a second type.

5. The method of claim 4, wherein a quantity of the one or more training fields of the second type from a particular device is based on a quantity of spatial streams assigned to that particular wireless device.

6. The method of claim 4, wherein a quantity of the one or more training fields of the second type is based on a quantity of spatial streams assigned to a wireless device assigned the most spatial streams.

7. The method of claim 2, wherein the first section of the first preamble comprises a first training field of a first type and wherein the second section of the first preamble comprises a second training field of the first type which contains larger cyclic shifts than the first training field of the first type.

8. The method of claim 1, wherein the first preamble includes a training field of a first type followed by one or more training fields of a second type, followed by a signal field, and wherein the second preamble includes a training field of the first type followed by one or more training fields of the second type, followed by a signal field, followed immediately by data, and wherein a number of training fields of the second type in the second preamble is the same as a number of training fields of the second type in the first preamble.

9. The method of claim 1, wherein the first preamble includes a training field of a first type followed by one or more training fields of a second type, followed by a signal field, followed immediately by data.

10. The method of claim 1, wherein the first preamble includes one or more training fields of a second type and the second preamble includes one or more training fields of the second type, and wherein the one or more training fields of the second type

in the first preamble are orthogonal in time, frequency, or through a code to the one or more training fields of the second type in the second preamble.

11. The method of claim 1, wherein the first preamble includes one or more training fields of a second type, and wherein the transmission includes a data section sent on a number of spatial streams and a number of tones, and the one or more training fields of the second type are sent such that each of the spatial streams transmits a known symbol over frequency tones spanning both the first section and the second section of the bandwidth.

12. The method of claim 1, wherein the first preamble and the second preamble each comprise a signal field, followed by a training field of a first type, followed by one or more training fields of a second type, followed by another signal field.

13. The method of claim 1, wherein the first preamble and the second preamble each comprise a training field of a first type, followed by one or more training fields of a second type, followed by a signal field, followed immediately by the first portion and the second portion of the transmission.

14. The method of claim 1, wherein the first preamble comprises symbols which are sent only in the first section of the bandwidth and the second preamble comprises symbols which are sent only in the second section of the bandwidth.

15. The method of claim 14, wherein the first section of the bandwidth and the second section of the bandwidth each comprise a non-overlapping set of tones.

16. An apparatus for wireless communication, comprising:

a receiver configured to receive a transmission over a bandwidth,
receiving the transmission comprising:
receiving a first preamble transmitted by a first wireless device;
simultaneously receiving a second preamble transmitted by a second wireless device;

receiving a first portion of the transmission in a first section of a bandwidth, the first portion transmitted by the first wireless device and including a first data section; and

simultaneously receiving a second portion of the transmission in a second section of the bandwidth, the second section of the bandwidth not overlapping with the first section of the, the second portion transmitted by the second wireless device, the second portion including a second data section.

17. The apparatus of claim 16, wherein the first preamble comprises a first section transmitted using a first format that is interpretable by wireless devices having a first set of capabilities, and further comprising a second section transmitted using a second format that is interpretable by wireless devices having a second set of capabilities, and wherein the second preamble comprises a third section transmitted using the first format that is interpretable by wireless devices having the first set of capabilities, and further comprising a fourth section transmitted using the second format that is interpretable by wireless devices having the second set of capabilities.

18. The apparatus of claim 17, wherein the first section of the first preamble and the third section of the second preamble each include a training field of a first type used for automatic gain control, a training field of a second type used for accurate frequency offset estimation, time synchronization, and channel estimation, and a signal field.

19. The apparatus of claim 16, wherein the second section of the first preamble and the fourth section of the second preamble each include one or more training fields of a second type.

20. An apparatus for wireless communication, comprising:

means for receiving a first preamble transmitted by a first wireless device;

means for simultaneously receiving a second preamble transmitted by a second wireless device;

means for receiving a first portion of the transmission in a first section of a bandwidth, the first portion transmitted by the first wireless device including a first data section; and

means for simultaneously receiving a second portion of the transmission in a second section of the bandwidth, the second section of the bandwidth not overlapping with the first section of the bandwidth, the second portion transmitted by the second wireless device, the second portion including a second data section.

CLAIMS

1. A method of wireless communication, the method comprising:

receiving a transmission from two or more wireless communication devices over a bandwidth, the transmission comprising:

a first preamble transmitted by a first wireless device on a first number of sub-bands of the bandwidth, the first preamble having one or more training fields and only one high efficiency signal field;

a second preamble transmitted simultaneously with the first preamble, by a second wireless device on a second number of sub-bands of the bandwidth, the second preamble having one or more training fields and only one high efficiency signal field;

a first data portion transmitted by the first wireless device on the first number of sub-bands; and

a second data portion transmitted simultaneously with the first data portion, by the second wireless device on the second number of sub-bands, the second number of sub-bands of the bandwidth not overlapping with the first number of sub-bands of the bandwidth.

2. The method of claim 1, wherein the first preamble comprises a first section transmitted using a first format is interpretable by wireless devices having a first set of capabilities, and further comprising a second section transmitted using a second format that is interpretable by wireless devices having

a second set of capabilities, and wherein the second preamble comprises a third section transmitted using the first format that is interpretable by wireless devices having the first set of capabilities, and further comprising a fourth section transmitted using the second format that is interpretable by wireless devices having the second set of capabilities.

3. The method of claim 2, wherein the first section of the first preamble and the third section of the second preamble each include:

- a training field of a first type used for automatic gain control;
- a training field of a second type used for accurate frequency offset estimation, time synchronization, and channel estimation; and
- a signal field.

4. The method of claim 2, wherein the second section of the first preamble and the fourth section of the second preamble each include one or more training fields of the second type.

5. The method of claim 4, wherein a quantity of the one or more training fields of the second type from a particular device is based on a quantity of spatial streams assigned to that particular wireless device.

6. The method of claim 4, wherein a quantity of the one or more training fields of the second type is based on a quantity of spatial streams assigned to a wireless device assigned the most spatial streams.

7. The method of claim 1, wherein the first section of the first preamble comprises a first training field of the first type and wherein the second section of the first preamble comprises a second training field of the first type which contains larger cyclic shifts than the first training field of the first type.

8. The method of claim 1, wherein the first preamble includes a training field of the first type followed by one or more training fields of the second type, followed by a signal field, and wherein the second preamble includes a training field of the first type followed by one or more training fields of the second type, followed by a signal field, followed immediately by data and wherein the number of training fields of the second type in the second preamble is the same as the number of training fields of the second type in the first preamble.

9. The method of claim 1, wherein the first preamble includes a training field of the first type followed by one or more training fields of the second type, followed by a signal field, followed immediately by data.

10. The method of claim 1, wherein the first preamble includes one or more training fields of the second type and the second preamble includes one or more training fields of the second type, and wherein the one or more training fields of the second type in the first preamble are orthogonal in time, frequency, or through a code to the one or more training fields of the second type in the second preamble.

11. The method of claim 1, wherein the first preamble includes one or more training fields of the second type, and wherein the transmission includes a data section sent on a number of spatial streams and a number of tones, and the one or more training fields of the second type are sent such that each of the spatial streams transmits a known symbol over frequency tones spanning both the first number of sub-bands and the second number of sub-bands of the bandwidth.

12. The method of claim 1, wherein the first preamble and the second preamble each comprise a signal field, followed by a training field of the first type, followed by one or more training fields of the second type, followed by another signal field.

13. The method of claim 1, wherein the first preamble and the second preamble each comprise a training field of the first type, followed by one or more training fields of the second type, followed by a signal field, followed immediately by the first data portion and the second data portion of the transmission.

14. The method of claim 1, wherein the first preamble comprises symbols which are sent only in the first number of sub-bands of the bandwidth and the second preamble comprises symbols which are sent only in the second number of sub-bands of the bandwidth.

15. The method of claim 14, wherein the first number of sub-bands of the bandwidth and the second number of sub-bands of the bandwidth each comprise a non-overlapping set of tones.

16. The method of claim 1, further comprising:
transmitting a downlink message to the first and second wireless devices, the downlink message setting the network allocation vector for the transmission and comprising information indicating a number of sub-bands of the bandwidth assigned to the first and second wireless devices, respectively.

17. An apparatus for wireless communication, comprising: a receiver configured to receive a transmission from two or more wireless communication devices over a bandwidth, the transmission comprising:

- a first preamble transmitted by a first wireless device on a first number of sub-bands of the bandwidth, the first preamble having one or more training fields and only one high efficiency signal field;
- a second preamble transmitted simultaneously with the first preamble, by a second wireless device on a second number of sub-bands of the bandwidth, the second preamble having one or more training fields and only one high efficiency signal field;
- a first data portion transmitted by the first wireless device on the first number of sub-bands; and
- a second data portion transmitted simultaneously with the first data portion, by the second wireless device on the second number of sub-bands, the second number of sub-bands of the bandwidth not overlapping with the first number of sub-bands of the bandwidth.

18. The apparatus of claim 17, wherein the first preamble comprises a first section transmitted using a first format that is interpretable by wireless devices having a first set of capabilities, and further comprising a second section transmitted using a second format that is interpretable by wireless devices having a second set of capabilities, and wherein the second preamble comprises a third section transmitted using the first format that is interpretable by wireless devices having the first set of capabilities, and further comprising a fourth section transmitted using the second format that is interpretable by wireless devices having the second set of capabilities.

19. The apparatus of claim **18**, wherein the first section of the first preamble and the third section of the second preamble each include a training field of a first type used for automatic gain control, a training field of a second type used for accurate frequency offset estimation, time synchronization, and channel estimation, and a signal field.

20. The apparatus of claim **17**, wherein the second section of the first preamble and the fourth section of the second preamble each include one or more training fields of the second type.

21. The apparatus of claim **17**, further comprising:
a transmitter configured to transmit a downlink message to the first and second wireless devices, the downlink message setting the network allocation vector for the transmission and comprising information indicating a number of sub-bands of the bandwidth assigned to the first and second wireless devices, respectively.

22. An apparatus for wireless communication, comprising:
means for receiving a transmission from two or more wireless communication devices over a bandwidth, the transmission comprising:

- a first preamble transmitted by a first wireless device on a first number of sub-bands of the bandwidth, the first preamble having one or more training fields and only one high efficiency signal field;
- a second preamble transmitted simultaneously with the first preamble, by a second wireless device on a second number of sub-bands of the bandwidth, the second preamble having one or more training fields and only one high efficiency signal field;
- a first data portion transmitted by the first wireless device on the first number of sub-bands; and
- a second data portion transmitted simultaneously with the first data portion, by the second wireless device on the second number of sub-bands, the second number of sub-bands of the bandwidth not overlapping with the first number of sub-bands of the bandwidth, the second portion transmitted by the second wireless device, the second portion including a second data section.