WHAT IS CLAIMED IS:

1. A method for operating a transmitting device, the method comprising:

obtaining a joint Gray code mapping in a composite quadrature amplitude modulation (QAM) constellation for a first receiving device and a second receiving device, the composite QAM constellation comprising a first constellation map for the first receiving device and a second constellation map for the second receiving device, and a corresponding first power allocation for the first receiving device; and

transmitting, by the transmitting device to the first receiving device, information about the first power allocation for the first receiving device, and information about the first constellation map for the first receiving device.

2. The method of claim 1, wherein the first power allocation and the joint Gray code mapping are determined in accordance with channel information associated with the first and second receiving devices.

3. The method of claim 1 or claim 2, further comprising determining coding rates for the first receiving device and the second receiving device in accordance with the first power allocation and the joint Gray code mapping in the composite QAM constellation.

4. The method of any one of claim 1 to claim 3, wherein each one of the first and second constellation maps comprises one or more QAM layers and is a subset of a total number of QAM layers in the composite QAM constellation associated with the first receiving device and the second receiving device.

5. The method of any one of claim 1 to claim 4, further comprising:

selecting the composite QAM constellation out of a plurality of constellation maps, wherein the composite QAM constellation is selected in accordance with the first power allocation for the first receiving device and a second power allocation for the second receiving device; and

transmitting an indicator of the selected composite QAM constellation to the first receiving device.

6. The method of claim 5, wherein the plurality of constellation maps comprises constellation maps with different power offsets between the first and second constellation maps, and wherein selecting the composite QAM constellation comprises selecting the composite QAM constellation with a power offset in accordance with a selection criterion.

7. The method of claim 6, wherein the selection criterion comprises at least one of: receiving device compatibility, power offsets, the first and second power allocations, and signaling overhead constraints.

8. The method of claim 5, wherein the plurality of constellation maps comprises at least one pre-defined constellation maps with different power offsets between the first and second constellation maps.

9. The method of claim 2, further comprising:

deriving the channel information from the first power allocation and the joint Gray code mapping in the composite QAM constellation; and

determining coding rates in accordance with the channel information.

10. The method of any one of claim 1 to claim 9, wherein the channel information comprises a channel quality indicator (CQI).

11. The method of any one of claim 1 to claim 9, wherein a first channel between the transmitting device and the first receiving device has a high signal to noise ratio (SNR), and wherein a second channel between the transmitting device and the second receiving device has a low SNR.

12. The method of claim 1 or claim 2, further comprising:

receiving data for the first receiving device and the second receiving device;

encoding data for the first receiving device in accordance with a first coding rate for the first receiving device, thereby producing first encoded data;

encoding data for the second receiving device in accordance with a second coding rate for the second receiving device, thereby producing second encoded data;

modulating the first encoded data in accordance with the first constellation map for the first receiving device and the second encoded data in accordance with the second constellation map for the second receiving device, thereby producing a QAM symbol; and

transmitting the QAM symbol to the first receiving device and the second receiving device.

13. A method for operating a first receiving device, the method comprising:

determining, by the first receiving device, a power allocation and a Gray code mapped composite quadrature amplitude modulation (QAM) constellation for the first receiving device and a second receiving device, and determining a coding rate of the first receiving device, wherein the

first receiving device has a higher signal to noise ratio (SNR) channel with a transmitting device than the second receiving device;

receiving, by the first receiving device, a QAM symbol;

demapping, by the first receiving device, the QAM symbol in accordance with the composite QAM constellation, thereby producing encoded data;

decoding, by the first receiving device, the encoded data in accordance with the coding rate of the first receiving device, thereby producing decoded data; and

processing, by the first receiving device, the decoded data.

14. The method of claim 13, wherein demapping the QAM symbol comprises demapping the QAM symbol further in accordance with a sub-QAM allocation of the second receiving device.

15. The method of claim 13 or claim 14, wherein determining the power allocation, the composite QAM constellation, and the coding rates comprises receiving a message including the power allocation, the composite QAM constellation, and the coding rate.

16. The method of claim 13 or claim 14, wherein determining the power allocation, the composite QAM constellation, and the coding rate comprises:

receiving an indicator of a selected constellation map; and

determining the power allocation and the composite QAM constellation in accordance with the indicator of the selected constellation map.

17. The method of claim 16, further comprising receiving a message including information about the coding rates.

18. The method of claim 16, further comprising determining the coding rates by using blind detection with candidate coding rates.

19. A method for operating a second receiving device, the method comprising:

determining, by the second receiving device, a constellation map forthe second receiving device in a Gray code mapped composite quadrature amplitude modulation (QAM) constellation for a first receiving device and the second receiving device, wherein a first channel between a transmitting device and the first receiving device has a higher signal to noise ratio (SNR) than a second channel between the transmitting device and the second receiving device

receiving, by the second receiving device, a QAM symbol;

demapping, by the second receiving device, the QAM symbol in accordance with the

constellation map, thereby producing encoded data;

decoding, by the second receiving device, the encoded data in accordance with a coding rate of the second receiving device, thereby producing decoded data; and

processing, by the second receiving device, the decoded data.

20. The method of claim 19, further comprising determining the coding rate of the second receiving device by using blind detection with candidate coding rates.

21. A method for operating a first receiving device, the method comprising:

receiving, by the first receiving device, information about a first power allocation for the first receiving device, and information about a Gray code mapped composite quadrature amplitude modulation (QAM) constellation for the first receiving device and a second receiving device, the composite QAM constellation comprising a first constellation map for the first receiving device, and a second constellation map for the second receiving device.

22. The method of claim 21, wherein the composite QAM constellation is selected out of a plurality of constellation maps, wherein the composite QAM constellation is selected in accordance with the first power allocation for the first receiving device and a second power allocation for the second receiving device, the method further comprising receiving, by the first receiving device, an indicator of the selected composite QAM constellation.

23. A transmitting device comprising means configured to implement a method in accordance with any one of claims 1 to 12.

24. A receiving device comprising means configured to implement a method in accordance with any one of claims 13 to 22.