CLAIMS

1. An apparatus for wireless communications, comprising: a processing system configured to generate a frame having an indication of multiple timer values for one or more wireless devices to be used for switching from a multiple user (MU) mode to a single user (SU) mode, wherein the multiple timer values comprise different timer values for different access categories (ACs) of an MU enhanced distributed channel access (EDCA) parameter set element included in the frame; and an interface for outputting the frame for transmission.

2. The apparatus of claim 1, wherein: each of the multiple timer values corresponds to a duration after which the wireless devices should switch from the MU mode to the SU mode, for a corresponding AC, if not scheduled for transmission for that corresponding AC.

3. The apparatus of claim 2, wherein each of the different timer values is based on delay tolerance of a corresponding AC.

4. The apparatus of claim 1, wherein the multiple timer values comprise: a first timer value for a first group of at least two access categories; and a second timer value for a second group of at least one access category.

5. The apparatus of claim 1, wherein the multiple timer values comprise: a first timer value for at least one of a Video AC or a Voice AC; and a second timer value, longer than the first timer value, for at least one of a Background AC or a Best Effort AC.

6. The apparatus of claim 1, wherein the multiple timer values comprise: a first timer value for a first group of the one or more wireless devices; and a second timer value for a second group of the one or more wireless devices.

7. The apparatus of claim 6, wherein the processing system is configured to: classify wireless devices in the first group based on first quality of service (QoS) requirements of traffic to be output for transmission from the first group of wireless devices; and classify wireless devices in the second group based on second QoS requirements of traffic to be output for transmission from the second group of wireless devices.

8. The apparatus of claim 1, wherein the multiple timer values comprise: a first timer value for a first type of frame to be output for transmission from the one or more wireless devices; and a second timer value for a second type of frame to be output for transmission from the one or more wireless devices.

9. The apparatus of claim 1, wherein the multiple timer values comprise: a first timer value for a first type of information to be output for transmission from the one or more wireless devices; and a second timer value for a second type of information to be output for transmission from the one or more wireless devices.

10. An apparatus for wireless communications, comprising: an interface for obtaining a first frame having an indication of different timer values for different access categories (ACs) of a multiple user (MU) enhanced distributed channel access (EDCA) parameter set element included in the first frame; and a processing system configured to: determine when to switch from the MU mode to a single user (SU) mode based on the multiple timer values, and generate one or more second frames for transmission via at least one of the SU mode or the MU mode, based on the determination.

11. The apparatus of claim 10, wherein: each of the multiple timer values corresponds to a duration after which the apparatus should switch from the MU mode to the SU mode, for a corresponding AC, if not scheduled for transmission for that corresponding AC.

12. The apparatus of claim 10, wherein the multiple timer values comprise: a first timer value for a first group of at least two access categories; and a second timer value for a second group of at least one access category.

13. The apparatus of claim 10, wherein the multiple timer values comprise: a first timer value for at least one of a Video AC or a Voice AC; and a second timer value, longer than the first timer value, for at least one of a Background AC or a Best Effort AC.

14. The apparatus of claim 10, wherein the processing system is configured to: identify a highest priority AC for traffic to be output for transmission; and set a single timer used to control switching from the MU mode to the SU mode based on a timer value for the highest priority AC.

15. The apparatus of claim 10, wherein the processing system is configured to: identify ACs for different traffic to be output for transmission; and set different timers used to individually control switching from the MU mode to the SU mode for different ACs based on timer values for the identified ACs.

16. The apparatus of claim 10, wherein: the multiple timer values comprise a first timer value for a first group of one or more wireless devices and a second timer value for a second group of one or more wireless devices; and the processing system is configured to use the first timer value or the second timer value depending on whether the apparatus is in the first group or the second group.

17. The apparatus of claim 10, wherein the multiple timer values comprise: a first timer value for a first type of frame to be output for transmission from the apparatus; and a second timer value for a second type of frame to be output for transmission from the apparatus.

18. The apparatus of claim 10, wherein the multiple timer values comprise: a first timer value for a first type of information to be output for transmission from the apparatus; and a second timer value for a second type of information to be output for transmission from the apparatus.

19. An apparatus for wireless communications, comprising: an interface for obtaining a first frame indicating single user (SU) enhanced distributed channel access (EDCA) parameters for at least a first access category (AC) and a second frame having an indication of timer values for different ACs of multiple user (MU) EDCA parameters; and a processing system configured to: switch from an MU mode to an SU mode based on the timer values; determine, while in the SU mode for the first AC, at least one of when or whether to use the SU EDCA parameters for the first AC, and generate one or more third frames of the first AC for transmission via the SU mode, based on the determination.

20. The apparatus of claim 19, wherein the processing system is configured to: use the SU EDCA parameters while remaining in the SU mode for the first AC for pre-association communications.

21. The apparatus of claim 19, wherein the processing system is configured to: remain in the SU mode for a plurality of ACs including the first AC, and use the SU EDCA parameters for the plurality of ACs for pre-association communications.

22. The apparatus of claim 19, wherein the processing system is configured to: remain in the SU mode for the first AC and use the SU EDCA parameters for the first AC after the apparatus had performed association with an access point (AP); and switch to the MU mode for the first AC after the apparatus has received a trigger from the AP to send MU data.

23. An apparatus for wireless communications, comprising: an interface for obtaining a frame having an indication of different timer values for different access categories (ACs) of a multiple user (MU) enhanced distributed channel access (EDCA) parameter set element included in the frame; and a processing system configured to: initiate a timer used for switching from a MU mode to a single user (SU) mode based on at least one timer value of the different timer values, and maintain the timer upon at least one of entering or exiting a first power mode in which one or more components of the apparatus are powered down.

24. The apparatus of claim 23, wherein the processing system is configured to maintain the timer by: halting the timer while in the first power mode; and resuming the timer upon exiting the first power mode.

25. The apparatus of claim 23, wherein the processing system is configured to maintain the timer by: clearing the timer when exiting the first power mode.

26. The apparatus of claim 23, wherein the processing system is configured to maintain the timer by: continuing to count down the timer while in the first power mode.

27. The apparatus of claim 23, wherein the processing system is configured to: clear the timer while in the SU mode.

28. The apparatus of claim 19, wherein the processing system is configured to: restart a backoff timer for the first AC, that was stopped after the apparatus had entered the SU mode, based on the SU EDCA parameters for the first AC.

29. The apparatus of claim 19, wherein the processing system is configured to: wait until an ongoing backoff timer for the first AC expires and, when the backoff timer expires, restart the backoff timer based on the SU EDCA parameters for the first AC.

30. The apparatus of claim 19, wherein the processing system is configured to: restart an ongoing backoff timer for the first AC, based on the SU EDCA parameters, if an amount of time remaining before expiration of the backoff timer is greater than or equal to a threshold time.