Claims

1. An apparatus comprising at least one processor, and at least one memory storing instructions which, when executed by the at least one processor, cause the apparatus at least to:

determine, based on an expiration of at least one time alignment timer of at least two time alignment timers, whether to flush one or more hybrid automatic repeat request, HARQ, buffers.

2. The apparatus according to claim 1, wherein a first time alignment timer of the at least two time alignment timers is associated with a first timing advance group, and a second time alignment timer of the at least two time alignment timers is associated with a second timing advance group.

3. The apparatus according to claim 2, wherein the first timing advance group corresponds to at least one of the following: a first transmission and reception point, a first cell identity, or a first control resource set pool index,

wherein the second timing advance group corresponds to at least one of the following: a second transmission and reception point, a second cell identity, or a second control resource set pool index.

4. The apparatus according to claim 2 or 3, further being caused to:

after the first time alignment timer expires, flush the one or more HARQ buffers if a timing advance command or a physical downlink control channel order associated with the second time advance group is not received before the second time alignment timer expires.

5. The apparatus according to claim 1, wherein the determination is based on an expiration of a first time alignment timer of the at least two time alignment timers relative to an expiration of the second time alignment timer of the at least two time alignment timers.

6. The apparatus according to claim 5, further being caused to:

flush the one or more HARQ buffers in response to the second time alignment timer expiring within a pre-defined time period relative to the expiration of the first time alignment timer.

7. The apparatus according to claim 5, further being caused to:

not flush the one or more HARQ buffers in response to the second time alignment timer not expiring within a pre-defined time period relative to the expiration of the first time alignment timer.

8. The apparatus according to claim 6 or 7, further being caused to:

start a third timer in response to the expiration of the first time alignment timer, wherein the third timer corresponds to the pre-defined time period, and wherein the determination is based on whether the second time alignment timer expires before the third timer expires.

9. The apparatus according to any of claims 2-8, wherein the first timing advance group and the second timing advance group are secondary timing advance groups, and wherein the one or more HARQ buffers correspond to cells associated with the first timing advance group and the second timing advance group.

10. The apparatus according to any of claims 2-8, wherein the first timing advance group and the second timing advance group are primary timing advance groups, and wherein the one or more HARQ buffers correspond to all serving cells configured for the apparatus.

11. The apparatus according to claim 1, further being caused to:

flush the one or more HARQ buffers in response to an expiration of a first time alignment timer of the at least two time alignment timers, wherein the flushed one or more HARQ buffers are associated with at least one of the following:

a first timing advance group, a first transmission and reception point, a first cell identity, or a first control resource set pool index associated with the first time alignment timer.

12. The apparatus according to claim 11, wherein a plurality of HARQ buffers of a cell are split into at least two groups, wherein the flushed one or more HARQ buffers comprise one group of the at least two groups.

13. The apparatus according to claim 12, further being caused to:

flush a second group of the at least two groups of HARQ buffers in response to an expiration of a second time alignment timer of the at least two time alignment timers, wherein the flushed second group is associated with at least one of the following: a second timing advance group, a second transmission and reception point, a second cell identity, or a second control resource set pool index associated with the second time alignment timer.

14. The apparatus according to claim 1, further being caused to:

flush the one or more HARQ buffers of one or more cells in response to an expiration of a first time alignment timer of the at least two time alignment timers, wherein the one or more cells comprise at least a cell configured with a single timing advance group, and wherein the first time alignment timer is associated with the single timing advance group.

15. The apparatus according to any preceding claim, wherein the apparatus comprises, or is comprised in, a user device.

16. A method comprising:

determining, based on an expiration of at least one time alignment timer of at least two time alignment timers, whether to flush one or more hybrid automatic repeat request, HARQ, buffers.

17. A non-transitory computer readable medium comprising program instructions which, when executed by an apparatus, cause the apparatus to perform at least the following:

determining, based on an expiration of at least one time alignment timer of at least two time alignment timers, whether to flush one or more hybrid automatic repeat request, HARQ, buffers