

TIMER CONTROL METHOD AND TIMER CONTROL APPARATUS

TECHNICAL FIELD

[01] The present disclosure relates to communication technology, and in particular to a timer controlling methods and apparatuses, electronic devices and computer readable storage media.

BACKGROUND

[02] In new radio (NR), a user equipment (UE) may monitor a beam signal. When the monitored beam signal does not meet the requirement, a physical layer may send a beam failure instance indication to a medium access control layer as one record of beam failure. In a case that the beam failure indication counter (BFI_COUNTER) indicates a value greater than or equal to a preset value while the medium access control layer still receives a beam failure instance indication sent by the physical layer, the UE may trigger a random access, and the random access initiated accordingly may be a contention free random access (CFRA) or a contention based random access (CBRA).

[03] In related art, a beam failure recovery timer is provided and the timer is reset or restarted upon the UE triggers the random access. If the timer does not expire, the UE preferably uses resources for contention free random access to initiate a contention free random access; while the timer expires, the UE preferably uses resources for contention random access to initiate a contention based random access. In this way, the UE would not occupy one type of resources for a long time to initiate one type of random access.

[04] In related art, if a random access is currently ongoing by the UE, when the beam failure indication counter indicates a value greater than or equal to the preset value and the medium access control layer receives a beam failure instance indication sent by the physical layer, the UE may trigger another random access. Then, the UE shall determine whether to continue the ongoing random access or to initiate the triggered random access. In most cases, the UE may continue the ongoing random access.

[05] The beam failure recovery timer for the ongoing random access is timing and will be reset or restarted upon triggering the triggered random access. However, when the UE determine to continue the ongoing random access, the beam failure recovery timer should not be reset but continue timing, that is, continue timing based on the current timing value.

timer is reset or restarted.

[82] FIG. 3 is a schematic flowchart illustrating still another method for controlling a timer according to some embodiments of the present disclosure. As shown in FIG. 3, the method further includes:

[83] At step S5, before resetting or restarting the beam failure recovery timer, whether the beam failure recovery timer is to be reset or restarted is determined according to second configuration information;

[84] If a determination result is that the beam failure recovery timer is to be reset or restarted, the beam failure recovery timer is reset or restarted.

[85] In one embodiment, upon initiating the triggered random access, the UE may determine whether the beam failure recovery timer is to be reset or restarted according to the second configuration information. If the determination result is that the beam failure recovery timer is to be reset or restarted, the beam failure recovery timer may be reset or restarted, and if the determination result is that the beam failure recovery timer is not to be reset or restarted, the beam failure recovery timer may be kept running, that is, continue timing based on the current timing value.

[86] For example, the beam failure recovery timer is determined to be reset or restarted according to the second configuration information, then the beam failure recovery timer can be restarted when the triggered random access is initiated. If the beam failure recovery timer expires when the timer value is T , the time period from the initiation of the triggered random access to the expiration of the beam failure recovery time is T , that is, the time period during which the UE occupies the resource of contention-free random access is T .

[87] If it is determined that the beam failure recovery timer is not to be reset or restarted according to the second configuration information, then when the triggered random access is initiated, the timing can be continued based on the current timing value t of the beam failure recovery timer. In this case, the time period from the initiation of the triggered random access to the expiration of the beam failure recovery timer is $T - t$, that is, the time period during which the UE occupies the resource of contention free random access is $T - t$.

[88] As such, by providing the second configuration information control device when the user initiates a random access triggered, whether to reset an operating beam failure recovery timer, the controllability of the beam failure recovery timer is improved, and thereby improving the controllability of the time period during which the UE occupies the resource of contention free random access.

CLAIMS

1. A timer controlling method, being applicable to an electronic device, comprising:
 - in response to that a medium access control layer receives a beam failure instance indication sent by a physical layer, determining whether a count value of a beam failure indication counter is greater than or equal to a preset value;
 - in response to that the count value of the beam failure indication counter is greater than or equal to the preset value, triggering a random access;
 - determining whether the triggered random access is to be initiated;
 - in response to determining that the triggered random access is to be initiated, upon initiating the triggered random access, resetting or restarting a beam failure recovery timer.
2. The method of claim 1, wherein determining whether the triggered random access is to be initiated, comprises:
 - in response to a currently ongoing random access by the electronic device, determining whether to initiate the triggered random access or continue the currently ongoing random access according to first configuration information;
 - in response to that a result of the determination indicates to initiate the triggered random access, initiating the triggered random access.
3. The method of claim 1, further comprising:
 - after the random access is triggered and before the triggered random access is initiated, keeping the beam failure recovery timer timing based on a current timing value.
4. The method of claim 1, further comprising:
 - before resetting or restarting the beam failure recovery timer, determining whether the beam failure recovery timer is to be reset or restarted according to second configuration information; wherein,
 - in response to determining that the beam failure recovery timer is to be reset or restarted, resetting or restarting the beam failure recovery timer.
5. The method of claim 1, further comprising:
 - in response to that the triggered random access is successful, setting the count value of the beam failure indication counter to zero.

6. The method of any of claims 1 to 5, wherein resetting or restarting the beam failure recovery timer comprises:

- determining a serving cell corresponding to the beam failure indication counter;
- resetting or restarting the beam failure recovery timer for the serving cell.

7. The method of claim 6, wherein the serving cell comprises at least one of the following:

- a primary cell,
- a primary secondary cell, and
- a serving cell other than the primary cell and the primary secondary cell.

8. A timer controlling apparatus, being applicable to an electronic device, comprising:

- a count value determining module, configured to, in response to that a medium access control layer receives a beam failure instance indication sent by a physical layer, determine whether a count value of a beam failure indication counter is greater than or equal to a preset value;

- a random access module, configured to, in response to that the count value of the beam failure indication counter is greater than or equal to the preset value, trigger a random access;

- an initiation determining module, configured to determine whether the triggered random access is to be initiated;

- a timer control module, configured to, in response to determining that the triggered random access is to be initiated, upon initiating the triggered random access, reset or restart a beam failure recovery timer.

9. The apparatus of claim 8, wherein the initiation determining module is configured to: in response to a currently ongoing random access by the electronic device, determine whether to initiate the triggered random access or continue the currently ongoing random access according to first configuration information; wherein,

- in response to that a result of the determination indicates to initiate the triggered random access, initiate the triggered random access.

10. The apparatus of claim 8, wherein the timer control module is further configured to,

after the random access is triggered, and before the triggered random access is initiated, keep the beam failure recovery timer timing based on a current timing value.

11. The apparatus of claim 8, further comprising:

a control determining module, configured to, before the timer control module resets or restarts the beam failure recovery timer, determine whether the beam failure recovery timer is to be reset or restarted according to second configuration information;

in response to determining that the beam failure recovery timer is to be reset or restarted, reset or restart the beam failure recovery timer.

12. The apparatus of claim 8, further comprising:

a counter control module, configured to, in response to that the triggered random access is successful, set the count value of the beam failure indication counter to zero.

13. The apparatus of any of claims 8 to 12, wherein the timer control module comprises:

a cell determining submodule, configured to determine a serving cell corresponding to the beam failure indication counter;

a timer control submodule, configured to reset or restart the beam failure recovery timer for the serving cell.

14. The apparatus of claim 13, wherein the serving cell comprises at least one of the following:

a primary cell, a primary secondary cell, and a serving cell other than the primary cell and the primary secondary cell.

15. An electronic device, comprising:

a processor,

a memory for storing executable instructions by the processor;

wherein the processor is configured to perform the method of any of claims 1 to 7.

16. A computer-readable medium storing computer program, wherein when the computer program is executed by a processor, the steps in the method of any of claims 1 to 7 are

implemented.