Claims

1. A method performed by a wireless communication node, the method comprising:

determining an initial transmission resource for wake-up signal (WUS) transmission;

determining an updated transmission resource for WUS transmission based at least on the initial transmission resource and an offset; and

transmitting, on the updated transmission resource, a WUS to at least one wireless communication device, wherein the offset is selected from a plurality of predetermined values based on a location of a paging occasion (PO) corresponding to the WUS.

2. The method of claim 1, wherein:

determining the initial transmission resource comprises determining an initial index of the initial transmission resource; and

determining the updated transmission resource comprises determining an updated index of the updated transmission resource based on: the initial index, the offset, and a quantity of transmission resources in a resource set for WUS transmission corresponding to a location gap between the WUS and the PO.

3. The method of claim 2, wherein the quantity is one, and the resource set includes a single transmission resource that is different from a legacy transmission resource.

4. The method of claim 1, wherein determining the updated transmission resource comprises:

determining an initial value for a pseudo random sequence;

generating the pseudo random sequence based on the initial value;

selecting a portion from the pseudo random sequence; and

calculating the offset based on the selected portion.

5. The method of claim 4, wherein the initial value is determined based on at least one of:

an identity (ID) of a cell where the at least one wireless communication device is located;

a current value of a discontinuous reception (DRX) cycle specific to the cell;

a maximum value of the DRX cycle specific to the cell;

a minimum value of the DRX cycle specific to the cell;

a maximum value of a DRX cycle specific to the at least one wireless communication device; and

a minimum value of the DRX cycle specific to the at least one wireless communication device.

6. The method of claim 4, wherein the portion is selected based on at least one of:

a system frame number (SFN) of the PO corresponding to the WUS;

a Hyper-SFN (H-SFN) of the PO corresponding to the WUS;

a sub-frame number of the PO corresponding to the WUS;

an identity (ID) of a cell where the at least one wireless communication device is located;

a discontinuous reception (DRX) cycle specific to the cell; and

a DRX cycle specific to the at least one wireless communication device.

7. The method of claim 4, wherein the initial value is determined based on at least one of:

a system frame number (SFN) of the PO corresponding to the WUS;

a Hyper-SFN (H-SFN) of the PO corresponding to the WUS;

a sub-frame number of the PO corresponding to the WUS;

an identity (ID) of a cell where the at least one wireless communication device is located;

a discontinuous reception (DRX) cycle specific to the cell; and

a DRX cycle specific to the at least one wireless communication device.

8. The method of claim 1, wherein determining the updated transmission resource comprises calculating the offset based on at least one of:

a system frame number (SFN) of the PO corresponding to the WUS;

a Hyper-SFN (H-SFN) of the PO corresponding to the WUS;

a sub-frame number of the PO corresponding to the WUS;

an identity (ID) of a cell where the at least one wireless communication device is located;

a current value of a discontinuous reception (DRX) cycle specific to the cell;

a maximum value of the DRX cycle specific to the cell;

a minimum value of the DRX cycle specific to the cell;

a maximum value of a DRX cycle specific to the at least one wireless communication device;

a minimum value of the DRX cycle specific to the at least one wireless communication device; and

at least one pre-determined integer.

9. The method of claim 8, wherein the offset is calculated based on at least one of: a modulo

operation, a division operation, and a floor function.

10. The method of claim 1, wherein:

the offset is determined based on a system frame number (SFN) of the PO corresponding to the WUS;

the offset changes by one as the SFN changes by T, which is a maximum value of a DRX cycle or a predetermined value; and

a value of the offset corresponding to a value of SFN in a current cycle of T is determined based on a value of the offset corresponding to a value of SFN in a previous cycle of T.

11. A method performed by a wireless communication device, the method comprising:

obtaining information about an initial transmission resource for wake-up signal (WUS) detection;

determining an updated transmission resource for WUS detection based at least on the initial transmission resource and an offset; and

detecting, on the updated transmission resource, a WUS transmitted from a wireless communication node, wherein the offset is selected from a plurality of predetermined values based on a location of a paging occasion (PO) corresponding to the WUS.

12. The method of claim 11, wherein:

obtaining information about an initial transmission resource comprises obtaining an initial index of the initial transmission resource based on a signaling from the wireless communication node or based on a group to which the wireless communication device belongs

for WUS detection; and

determining the updated transmission resource comprises determining an updated index of the updated transmission resource based on: the initial index, the offset, and a quantity of transmission resources in a resource set for WUS detection corresponding to a location gap between the WUS and the PO.

13. The method of claim 12, wherein the quantity is one, and the resource set includes a single transmission resource that is different from a legacy transmission resource.

14. The method of claim 11, wherein determining the updated transmission resource comprises:

determining an initial value for a pseudo random sequence;

generating the pseudo random sequence based on the initial value;

selecting a portion from the pseudo random sequence; and

calculating the offset based on the selected portion.

15. The method of claim 14, wherein the initial value is determined based on at least one of:

an identity (ID) of a cell where the wireless communication device is located;

a current value of a discontinuous reception (DRX) cycle specific to the cell;

a maximum value of the DRX cycle specific to the cell;

a minimum value of the DRX cycle specific to the cell;

a maximum value of a DRX cycle specific to the wireless communication device; and

a minimum value of the DRX cycle specific to the wireless communication device.

16. The method of claim 14, wherein the portion is selected based on at least one of:

a system frame number (SFN) of the PO corresponding to the WUS;

a Hyper-SFN (H-SFN) of the PO corresponding to the WUS;

a sub-frame number of the PO corresponding to the WUS;

an identity (ID) of a cell where the wireless communication device is located;

a discontinuous reception (DRX) cycle specific to the cell; and

a DRX cycle specific to the wireless communication device.

17. The method of claim 14, wherein the initial value is determined based on at least one of:

a system frame number (SFN) of the PO corresponding to the WUS;

a Hyper-SFN (H-SFN) of the PO corresponding to the WUS;

a sub-frame number of the PO corresponding to the WUS;

an identity (ID) of a cell where the wireless communication device is located;

a discontinuous reception (DRX) cycle specific to the cell; and

a DRX cycle specific to the wireless communication device.

18. The method of claim 11, wherein determining the updated transmission resource comprises calculating the offset based on at least one of:

a system frame number (SFN) of the PO corresponding to the WUS;

a Hyper-SFN (H-SFN) of the PO corresponding to the WUS;

a sub-frame number of the PO corresponding to the WUS;

an identity (ID) of a cell where the wireless communication device is located;

a current value of a discontinuous reception (DRX) cycle specific to the cell;

a maximum value of the DRX cycle specific to the cell;

a minimum value of the DRX cycle specific to the cell;

a maximum value of a DRX cycle specific to the wireless communication device;

a minimum value of the DRX cycle specific to the wireless communication device; and

at least one pre-determined integer.

19. The method of claim 18, wherein the offset is calculated based on at least one of: a modulo operation, a division operation, and a floor function.

20. The method of claim 11, wherein:

the offset is determined based on a system frame number (SFN) of the PO corresponding to the WUS;

the offset changes by one as the SFN changes by T, which is a maximum value of a DRX cycle or a predetermined value; and

a value of the offset corresponding to a value of SFN in a current cycle of T is determined based on a value of the offset corresponding to a value of SFN in a previous cycle of T.

21. A wireless communication node configured to carry out the method of any one of claims 1 through 10.

22. A wireless communication device configured to carry out the method of any one of claims 11 through 20.

23. A non-transitory computer-readable medium having stored thereon computer-executable instructions for carrying out the method of any one of claims 1 through 20.