

WHAT IS CLAIMED IS:

1. An apparatus, comprising:

at least one processor; and

at least one memory including computer program code;

5 the at least one memory and the computer program code are configured to, with the at least one processor, cause the apparatus at least to:

receive, from a network, information indicating one or more occasions for detection of physical downlink control channel (PDCCH) transmission carrying a wake-up indication;

10 determine, based on reception of signaling indicating the apparatus to end active time, to start a predetermined time duration, wherein the apparatus does not monitor for any of the one or more occasions until after the end of the predetermined time duration;

determine, depending on whether at least one of the one or more occasions occurs after the predetermined time duration, a configuration for transmitting uplink information; and

15 transmit the uplink information to the network based on the configuration.

2. The apparatus of claim 1, wherein the signaling indicating to end the active time comprises at least one of the following: a discontinuous reception (DRX) command medium access control (MAC) control element (CE) or a long DRX command MAC CE.

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3. The apparatus of claim 1, wherein the PDCCH transmission is addressed to a power saving radio network temporary identifier.

4. The apparatus of claim 1, wherein the at least one memory and the computer
25 program code are configured to, with the at least one processor, cause the apparatus further to:

determine whether the apparatus is/will be in active time at the time of the one or more occasions; and

30 in accordance with a determination that the apparatus is/will be in active time, determining to skip monitoring the one or more occasions; or

in accordance with a determination that the apparatus will not be/is not in active time, determining to monitor the one or more occasions.

5. The apparatus of claim 1, wherein transmitting the uplink information to the network comprises:

in accordance with the determination that all of the one or more occasions overlap the predetermined time duration,

5 transmitting the uplink information based on a first configuration associated with a discontinuous reception on duration timer being running.

6. The apparatus of claim 1, wherein transmitting the uplink information to the network comprises:

10 in accordance with the determination that at least one of the one or more occasions is not overlapping the predetermined time duration,

monitoring the PDCCH transmission during the at least one non-overlapping occasion of the one or more occasions; and

in accordance with a determination that the apparatus does not detect the PDCCH transmission carrying the wake-up indication to the apparatus during the at least one non-overlapping occasion, transmitting the uplink information based on a second configuration associated with a discontinuous reception on duration timer not being running; or

in accordance with a determination that the apparatus detects the PDCCH transmission carrying the wake-up indication to the apparatus during the at least one non-overlapping occasion, transmitting the uplink information based on the detected PDCCH transmission.

7. The apparatus of claim 1, wherein transmitting the uplink information to the network comprises:

25 in accordance with the determination that all of the one or more occasions are not overlapping with the predetermined time duration,

monitoring the PDCCH transmission during the at least one non-overlapping occasion of the one or more occasions; and

in accordance with a determination that the apparatus does not detect the PDCCH transmission carrying the wake-up indication to the apparatus, determining to start a discontinuous reception on duration timer, and transmitting the uplink information based on a first configuration associated with a discontinuous reception on duration timer being running; or

in accordance with a determination that the apparatus detects the PDCCH

transmission carrying the wake-up indication to the apparatus during the at least one non-overlapping occasion, transmitting the uplink information based on the detected PDCCH transmission.

5 8. The apparatus of claim 1, wherein transmitting the uplink information to network comprises:

in accordance with a determination that information transmitted in the one or more occasions is the same and that at least one of the one or more occasions does not overlap the predetermined time duration,

10 detecting at least one PDCCH transmission carrying the wake-up indication to the apparatus during the at least one non-overlapping occasion; and

transmitting the uplink information to the network based on the detected at least one PDCCH transmission.

15 9. The apparatus of claim 1, wherein transmitting the uplink information to the network comprises:

in accordance with a determination that the information transmitted in the one or more occasions is allowed to be different and that at least one of the one or more occasions overlaps with the predetermined time duration, transmitting the uplink information based on a first
20 configuration associated with a discontinuous reception on duration timer being running.

10. The apparatus of claim 1, wherein the active time comprises at least one of: Active Time associated a discontinuous reception cycle, a bandwidth part switch gap, or a measurement gap.

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11. The apparatus of any of claims 1 to 10, wherein the predetermined time duration overlaps active time of the apparatus.

12. The apparatus of any of claims 1 to 11, wherein the predetermined time duration
30 corresponds to ambiguity time between the apparatus and the network, the ambiguity being related to the network not knowing the exact time when the apparatus has decoded the signaling.

13. The apparatus of any of claims 1 to 12, wherein the predetermined time duration

corresponds to 4 milliseconds.

14. The apparatus of claim 1, wherein transmitting the uplink information to the network comprises: in accordance with a determination that all of the one or more occasions
5 in time domain occur in active time, which is overlapping with the predetermined time duration, considering grants, assignments, DRX Command MAC CE, Long DRX Command MAC CE received and scheduling request sent until 4ms prior to start of the last of the one or more occasions, or within bandwidth part switching interruption length, or during a measurement gap, transmitting the uplink information based on a first configuration
10 associated with a discontinuous reception on duration timer being running.

15. The apparatus of any one of claims 1 to 14, wherein the apparatus comprises a terminal device.

16. An apparatus, comprising:
at least one processor; and
at least one memory including computer program code;
the at least one memory and the computer program code are configured to, with the
at least one processor, cause the apparatus at least to:
20 determine one or more occasions configured for detection of physical downlink control channel (PDCCH) transmission carrying a wake-up indication;
transmit to a user equipment information indicating the one or more occasions;
determine whether the user equipment is expected to monitor any of the one or more occasions based on signaling indicating the user equipment to end active time, the signaling
25 starting a predetermined time duration, wherein any of the one or more occasions are not monitored until after the end of the predetermined time duration; and
receive uplink information from the user equipment based on a configuration which is determined based on whether the user equipment is expected to monitor any of the at least one occasion.

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17. The apparatus of claim 16, wherein receiving the uplink information from the user equipment comprises:

in accordance with a determination that all of the one or more occasions overlap the predetermined time duration, receive the uplink information based on a first configuration

associated with a discontinuous reception on duration timer being running.

18. The apparatus of claim 16, wherein receiving the uplink information from the user equipment comprises:

5 in accordance with a determination that at least one of the one or more occasions is not overlapping the predetermined time duration, receive the uplink information from the user equipment based on the non-overlapping at least one occasion.

10 19. The apparatus of claim 16, wherein receiving the uplink information from the user equipment comprises:

 in accordance with a determination that information transmitted in the one or more occasions is the same and that at least one of the one or more occasions is not overlapping with the predetermined time duration, receive the uplink information from the user equipment based on the non-overlapping at least one occasion.

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20 20. The apparatus of claim 16, wherein receiving the uplink information from the user equipment comprises:

 in accordance with a determination that information transmitted in the one or more occasions is allowed to be different and that at least one of the one or more occasions overlaps with the predetermined time duration, receive the uplink information based on a first configuration associated with a discontinuous reception on duration timer being running.

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21. The apparatus of claim 16, wherein receiving the uplink information from the user equipment comprises:

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 in accordance with the determination that at least one of the one or more occasions is not overlapping with the predetermined time duration, receive the uplink information based on a second configuration associated with a discontinuous reception on duration timer not being running.

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22. The apparatus of claim 16, wherein receiving the uplink information from the user equipment comprises:

 in accordance with the determination that at least one of the one or more occasions is not overlapping with the predetermined time duration; and

 in accordance with a determination that the user equipment does not detect the

PDCCH transmission carrying the wake-up indication to the user equipment on the non-overlapping at least one occasion, receive the uplink information based on a second configuration associated with a discontinuous reception on duration timer not being running; or

5 in accordance with a determination that the user equipment detects at least one PDCCH transmission carrying the wake-up indication to the user equipment on the non-overlapping at least one occasion, receive the uplink information based on the detected at least one PDCCH transmission.

10 23. The apparatus of any one of claims 16 to 22, wherein the active time comprises at least one of: Active Time associated a discontinuous reception (DRX) cycle, a bandwidth part switch gap, or a measurement gap.

15 24. The apparatus of any of claims 16 to 23, wherein the predetermined time duration overlaps active time of the user equipment.

20 25. The apparatus of any of claims 16 to 24, wherein the predetermined time duration corresponds to ambiguity time between the apparatus and the user equipment, the ambiguity being related to the apparatus not knowing the exact time when the user equipment has decoded the signaling.

26. The apparatus of any of claims 16 to 25, wherein the predetermined time duration corresponds to 4 milliseconds.

25 27. The apparatus of any one of claims 16 to 26, wherein the apparatus comprises a network device.

28. A method at a user equipment, comprising:
receiving, from a network, information indicating one or more occasions for detection
30 of physical downlink control channel (PDCCH) transmission carrying a wake-up indication;
determining, based on reception of signaling indicating the apparatus to end active time, to start a predetermined time duration, wherein the apparatus does not monitor for any of the one or more occasions until after the end of the predetermined time duration;
determining, depending on whether at least one of the one or more occasions occurs

after the predetermined time duration, a configuration for transmitting uplink information;
and

transmitting the uplink information to the network based on the configuration.

- 5 29. A method at a network device, comprising:
 determining one or more occasions configured for detection of physical downlink
control channel (PDCCH) transmission carrying a wake-up indication;
 transmitting to a user equipment information indicating the one or more occasions;
 determining whether the user equipment is expected to monitor any of the one or more
10 occasions based on signaling indicating the user equipment to end active time, the signaling
starting a predetermined time duration, wherein any of the one or more occasions are not
monitored until after the end of the predetermined time duration; and
 receiving uplink information from the user equipment based on a configuration which
is determined based on whether the user equipment is expected to monitor any of the at least
15 one occasion.

30. An apparatus comprising means for performing a method according to claim 28
or 29.

- 20 31. A computer program product that is stored on a computer readable medium and
includes machine-executable instructions, wherein the machine-executable instructions,
when being executed, cause the machine to perform the method of claim 28 or 29.

32. A computer program product that is stored on a computer readable medium and
25 includes machine-executable instructions, wherein the machine-executable instructions,
when being executed, cause the machine to perform the method of claim 28 or 29.

33. A computer readable storage medium comprising program instructions stored
thereon, the instructions, when executed by an apparatus, causing the apparatus to perform
30 the method of claims 28 or 29.

34. A computer readable storage medium comprising program instructions stored
thereon the instructions, when executed by an apparatus, causing the apparatus to perform
the method of claim 28 or 29.