

CLAIMS

1. A method for Power Headroom Report (PHR) for a serving cell, wherein an active Bandwidth Part (BWP) of the serving cell is a dormant BWP;
comprising:
sending, by a user equipment (UE), a PHR to a network node to report Power Headroom (PH) of the serving cell;
wherein at least one of the following is reported for the serving cell:
 - Type 1 PH;
 - Type 3 PH;
 - a designated field indicating whether the PH is Type 1 or Type 3;
 - a designated field indicating whether the serving cell is on a dormant BWP or non-dormant BWP.
2. The method of Claim 1, wherein the reported PH is Type 1 PH with virtual field indicating a PUSCH reference format is used.
3. The method of Claim 1, wherein the reported PH is Type 3 PH depending on whether there is SRS transmission on the dormant BWP when the PHR is reported.
4. The method of Claim 1, wherein the PHR is triggered upon a switching event that the active BWP on the serving cell switching from a dormant BWP to a non-dormant BWP or that the active BWP on the serving cell switching from a non-dormant BWP to a dormant BWP.
5. The method of Claim 4, wherein the PHR triggering is upon switching the active BWP from a dormant BWP to a non-dormant BWP if no PHR is reported for the serving cell when the active BWP is a dormant BWP.
6. The method of Claim 4, wherein the method further comprises:
continuing downlink Reference Signals measurements for PH calculation without reporting to the network node, till the PHR is triggered after the active BWP switches from a dormant BWP to a non-dormant BWP.
7. The method of Claim 1, wherein the PHR triggering upon activation of the serving cell when the first active BWP of the serving cell is not a dormant BWP.
8. The method of Claim 1, wherein the UE is configured with dual connectivity with serving cells served with two network nodes, and the network node to which the UE sends the PHR is one of the two network nodes.
9. The method of Claim 4 or 7, wherein the trigger of PHR is configured by the network node.
10. The method of Claim 9, wherein the trigger of PHR is made on a per serving cell when the active BWP is a dormant BWP.
11. A method for Power Headroom Report (PHR) for a serving cell, wherein an active Bandwidth Part (BWP) of the serving cell is a dormant BWP;

comprising:

receiving, by a network node, a PHR from a user equipment (UE) to report Power Headroom (PH) of the serving cell;

wherein at least one of the following is reported for the serving cell:

- Type 1 PH;
- Type 3 PH;
- a designated field indicating whether the PH is Type 1 or Type 3;
- a designated field indicating whether the serving cell is on a dormant BWP or non-dormant BWP; and

obtaining PH value for the serving cell from the PHR.

12. The method of claim 11, wherein the reported PH is Type 1 PH with virtual field indicating a PUSCH reference format is used.

13. The method of claim 11, wherein the reported PH is Type 3 PH depending on whether there is SRS transmission on the dormant BWP when the PHR is reported.

14. The method of claim 11, wherein the method further comprises:
configuring the trigger of PHR on the UE.

15. The method of claim 14, wherein the trigger of PHR is configured upon a switching event that active BWP on the serving cell switching from a dormant BWP to a non-dormant BWP or that the active BWP on the serving cell switching from a non-dormant BWP to a dormant BWP.

16. The method of claim 14, wherein the trigger of PHR is made on a per serving cell when the active BWP is a dormant BWP.

17. The method of claim 11, wherein the UE is configured with dual connectivity with serving cells served with two network nodes, and the network node receiving the PHR is one of the two network nodes.

18. A method for Power Headroom Report (PHR) for a serving cell, comprising:
sending, by a user equipment (UE), a PHR to a network node to report Power Headroom (PH) of the serving cell when the PHR is triggered upon a switching event that an active Bandwidth Part (BWP) on the serving cell switching from a dormant BWP to a non-dormant BWP or that the active BWP on the serving cell switching from a non-dormant BWP to a dormant BWP.

19. The method of claim 18, wherein the reported PH is indicated by one of the following:

- Type 1 PH;
- Type 3 PH;
- a designated field indicating whether the PH is Type 1 or Type 3;
- a designated field indicating whether the serving cell is on a dormant BWP or non-dormant BWP.

20. A user equipment (UE) for Power Headroom Report (PHR) for a serving cell, wherein an active Bandwidth Part (BWP) of the serving cell is a dormant BWP;

comprising:
at least one processor; and
at least one memory including computer program code;
the at least one memory and the computer program code configured to, with the at least one processor, cause the UE at least to perform:
sending a PHR to a network node to report Power Headroom (PH) of the serving cell;
wherein at least one of the following is reported for the serving cell:
- Type 1 PH;
- Type 3 PH;
- a designated field indicating whether the PH is Type 1 or Type 3;
- a designated field indicating whether the serving cell is on a dormant BWP or non-dormant BWP.

21. The UE of Claim 20, wherein the reported PH is Type 1 PH with virtual field indicating a PUSCH reference format is used.

22. The UE of Claim 20, wherein the reported PH is Type 3 PH depending on whether there is SRS transmission on the dormant BWP when the PHR is reported.

23. The UE of Claim 20, wherein the PHR is triggered upon a switching event that active BWP on the serving cell switching from a dormant BWP to a non-dormant BWP or that the active BWP on the serving cell switching from a non-dormant BWP to a dormant BWP.

24. The UE of Claim 23, wherein the PHR triggering is upon switching the active BWP from a dormant BWP to a non-dormant BWP if no PHR is reported for the serving cell when the active BWP is a dormant BWP.

25. The UE of Claim 23, wherein the UE further performs:
continuing downlink Reference Signals measurements for PH calculation without reporting to the network node, till the PHR is triggered after the active BWP switches from a dormant BWP to a non-dormant BWP.

26. The UE of Claim 20, wherein the PHR triggering upon activation of the serving cell when the first active BWP of the serving cell is not a dormant BWP.

27. The UE of Claim 20, wherein the UE is configured with dual connectivity with serving cells served with two network nodes, and the network node to which the UE sends the PHR is one of the two network nodes.

28. The UE of Claim 23 or 26, wherein the trigger of PHR is configured by the network node.

29. The UE of Claim 28, wherein the trigger of PHR is made on a per serving cell when the active BWP is a dormant BWP.

30. A network node for Power Headroom Report (PHR) for a serving cell, wherein an active Bandwidth Part (BWP) of the serving cell is a dormant BWP;
comprising:

at least one processor; and
at least one memory including computer program code;
the at least one memory and the computer program code configured to, with the at least one processor, cause the network node at least to perform:
receiving a PHR from a user equipment (UE) to report Power Headroom (PH) of the serving cell;

wherein at least one of the following is reported for the serving cell:

- Type 1 PH;
- Type 3 PH;
- a designated field indicating whether the PH is Type 1 or Type 3;
- a designated field indicating whether the serving cell is on a dormant BWP or non-dormant BWP; and

obtaining PH value for the serving cell from the PHR.

31. The network node of claim 30, wherein the reported PH is Type 1 PH with virtual field indicating a PUSCH reference format is used.

32. The network node of claim 30, wherein the reported PH is Type 3 PH depending on whether there is SRS transmission on the dormant BWP when the PHR is reported.

33. The network node of claim 30, wherein the network node further performs:
configuring the trigger of PHR on the UE.

34. The network node of claim 33 wherein the trigger of PHR is configured upon a switching event that active BWP on the serving cell switching from a dormant BWP to a non-dormant BWP or that the active BWP on the serving cell switching from a non-dormant BWP to a dormant BWP.

35. The network node of claim 33, wherein the trigger of PHR is made on a per serving cell when the active BWP is a dormant BWP.

36. The method of claim 30, wherein the UE is configured with dual connectivity with serving cells served with two network nodes, and the network node receiving the PHR is one of the two network nodes.

37. A user equipment (UE) for Power Headroom Report (PHR) for a serving cell, comprising:

at least one processor; and

at least one memory including computer program code;

the at least one memory and the computer program code configured to, with the at least one processor, cause the UE at least to perform:

sending a PHR to a network node to report Power Headroom (PH) of the serving cell when the PHR is triggered upon a switching event that active Bandwidth Part (BWP) on the serving cell switching from a dormant BWP to a non-dormant BWP or that the active BWP on the serving cell switching from a non-dormant BWP to a dormant BWP.

38. The UE of claim 37, wherein the reported PH is indicated by one of the following:

- Type 1 PH;
- Type 3 PH;

- a designated field indicating whether the PH is Type 1 or Type 3;
- a designated field indicating whether the serving cell is on a dormant BWP or non-dormant BWP.

39. A method for Power Headroom Report (PHR) for a serving cell, wherein an active Bandwidth Part (BWP) of the serving cell is a dormant BWP;
comprising:

sending, by a user equipment (UE), a PHR to at least a network node to report Power Headroom (PH) of the serving cell;

wherein at least one of the following is reported for the serving cell:

- Type 1 PH;
 - Type 3 PH;
 - a designated field indicating whether the PH is Type 1 or Type 3;
 - a designated field indicating whether the serving cell is on a dormant BWP or non-dormant BWP;
- receiving, by the network node, the PHR from the UE to report PH of the serving cell;
and
obtaining, by the network node, PH value from the PHR for the serving cell.

40. A system for Power Headroom Report (PHR) for a serving cell, comprising a user equipment (UE) and at least a network node,
wherein an active Bandwidth Part (BWP) of the serving cell is a dormant BWP;
wherein the UE comprises:

at least one first processor; and

at least one first memory including first computer program code;

the at least one memory and the computer program code configured to, with the at least one processor, cause the UE at least to perform:

sending a PHR to the network node to report Power Headroom (PH) of the serving cell;
wherein at least one of the following is reported for the serving cell:

- Type 1 PH;
- Type 3 PH;
- a designated field indicating whether the PH is Type 1 or Type 3;
- a designated field indicating whether the serving cell is on a dormant BWP or non-dormant BWP;

wherein the network node comprises:

at least one second processor; and

at least one second memory including second computer program code;

the at least one memory and the computer program code configured to, with the at least one processor, cause the network node at least to perform:

receiving the PHR from the UE to report PH of the serving cell; and
obtaining PH value for the serving cell. from the PHR.