CLAIMS

1. A method (1200) by a wireless device (110) comprising:

receiving (1202), from a network node (160), a paging early indicator, PEI, configuration comprising an indication of a mapping of a PEI to a plurality of paging occasions;

receiving (1204), from the network node, the PEI; and

based on the mapping of the PEI to the plurality of paging occasions, monitoring (1206) a shared channel for paging in one of the plurality of paging occasions if the received PEI indicates that the paging is intended for the UE.

2. The method of Claim 1, further comprising determining, based on the PEI configuration comprising the indication of the mapping, that the PEI is mapped to the plurality of paging occasions.

3. The method of any one of Claims 1 to 2, wherein the first plurality of paging occasions comprise a number of consecutive paging occasions.

4. The method of any one of Claims 1 to 3, wherein the PEI is received on a control channel, and the method further comprises monitoring the control channel during a PEI search window.

5. The method of Claim 4, wherein the PEI search window is defined by a offset start and a offset stop, and the method further comprises measuring the offset start and the offset stop from a first reference point to determine the PEI search window.

6. The method of Claim 5, wherein the first reference point comprises a system frame number.

7. The method of Claim 5, wherein the PEI search window is determined based on and/or is measured from at least one reference paging occasion.

8. The method of any one of Claims 1 to 7, wherein the PEI configuration is received as downlink control information, DCI, and wherein the DCI comprises a bitfield indicating a subset of the plurality of paging occasions that include paging.

9. The method of Claim 8, wherein the bitfield comprises a plurality of bits, and wherein each of the plurality of bits indicates a respective one of the plurality of paging occasions.

10. The method of Claim 8, wherein the bitfield comprises a plurality of bits, and wherein each of the plurality of bits indicates a subset of the plurality of paging occasions.

11. The method of Claim 8, wherein the wireless device is one of a plurality of wireless devices associated with a group of wireless devices, and wherein the DCI comprises a bitfield indicating the group of wireless devices, and wherein each of the plurality of wireless devices associated with the group of wireless devices is configured to monitor the shared channel during the plurality of paging occasions based on the mapping of the PEI to the plurality of paging occasions.

12. The method of any one of Claims 1 to 7, wherein the PEI configuration is received as system information, SI.

13. The method of any one of Claims 1 to 12, further comprising, in response to receiving the PEI, monitoring every *n*-th paging occasion in a sequence of *m* paging occasions.

14. A method (1500) by a network node (160) comprising:

transmitting (1502), to at least one wireless device (110), a paging early indicator, PEI, configuration comprising an indication of a mapping of a first PEI to a plurality of paging occasions; and

based on the mapping, transmitting (1504) the PEI to the at least one wireless device to trigger monitoring of a shared channel for paging in one of the plurality of paging occasions by the at least one wireless device, wherein the paging is intended for the at least one wireless device.

15. The method of Claim 14, wherein the at least one wireless device comprises a plurality of wireless devices, the PEI triggering monitoring of the shared channel by the plurality of wireless devices in the plurality of paging occasions.

16. The method of any one of Claims 14 to 15, wherein:

the at least one wireless device comprises a first wireless device and a second wireless device,

the PEI triggers monitoring of the shared channel by the first wireless device in the plurality of paging occasions, and

the PEI triggers monitoring of the shared channel by the second wireless device in the plurality of paging occasions.

17. The method of any one of Claims 14 to 15, wherein:

the at least one wireless device comprises a first wireless device and a second wireless device,

the plurality of paging occasions comprises a first paging occasion and a second paging occasion,

the PEI triggers monitoring of the shared channel by the first wireless device in the first paging occasion, and

the PEI triggers monitoring of the shared channel by the second wireless device in the second paging occasion.

18. The method of any one of Claims 14 to 17, wherein the first plurality of paging occasions comprise a number of consecutive paging occasions.

19. The method of any one of Claims 14 to 18, further comprising determining the mapping of the PEI to the plurality of paging occasions based on at least one of a performance of a network, a performance of the at least one wireless device, network energy efficiency, and user equipment energy efficiency.

20. The method of any one of Claims 14 to 19, wherein the PEI is transmitted on a shared channel, and the method further comprises configuring the at least one wireless device to monitor the control channel during a PEI search window.

21. The method of Claim 20, wherein the search window is defined by a offset start and a offset stop, and wherein the method further comprises configuring the at least one wireless device to measure the offset start and the offset stop from a first reference point.

22. The method of Claim 21, wherein the first reference point comprises a system frame number.

23. The method of Claim 20, further comprising configuring the at least one wireless device with at least one reference paging occasion, and configuring the at least one wireless device to determine the PEI search window based on the at least one reference paging occasion.

24. The method of any one of Claims 14 to 23, wherein the PEI is transmitted on the shared channel to at least a first wireless device and a second wireless device, and wherein the method further comprises:

configuring the first wireless device to monitor the shared channel during a first PEI search window; and

configuring the second wireless device to monitor the shared channel during a second PEI search window.

25. The method of Claim 24, wherein:

the first PEI search window is defined by a first offset start and a first offset stop,

the second PEI search window is defined by a second offset start and a second offset stop, and

the first PEI search window at least partially overlaps with the second PEI search window.

26. The method of Claim 25, wherein:

the first offset start and a first offset stop are measured from a first reference point associated with the first wireless device, and

the second offset start and the second offset stop are measured from a second reference point associated with the second wireless device.

27. The method of Claim 26, wherein the first reference point comprises a first system frame number and the second reference point comprises a second system frame number.

28. The method of any one of Claims 14 to 27, wherein the PEI configuration is transmitted as downlink control information, DCI, and wherein the DCI comprises a bitfield indicating a subset of the plurality of paging occasions that include paging.

29. The method of Claim 28, wherein the bitfield comprises a plurality of bits, and wherein each of the plurality of bits indicates a respective one of the plurality of paging occasions.

30. The method of Claim 28, wherein the bitfield comprises a plurality of bits, and wherein each of the plurality of bits indicates a subset of the plurality of paging occasions.

31. The method of any one of Claims 28 to 30, wherein the at least one wireless device comprises a plurality of wireless devices, and wherein the DCI comprises a bitfield indicating a subset of the plurality

of wireless devices, and wherein each wireless device in the subset of wireless devices is configured to monitor the shared channel during the plurality of paging occasions based on the mapping of the PEI to the plurality of paging occasions.

32. The method of any one of Claims 14 to 31, wherein the PEI configuration is transmitted as system information, SI.

33. The method of any one of Claims 14 to 32, further comprising determining a number of the plurality of paging occasions to be mapped to the PEI, and wherein number of the plurality of paging occasions is determined based on at least one of:

a traffic measurement;

a traffic pattern;

an acceptable delay;

a number of wireless devices configured with the PEI;

an averaging paging rate of each paging occasion in the plurality of paging occasions; and

a false paging impact.

34. The method of any one of Claims 14 to 33, further comprising configuring the at least one wireless device to, in response to receiving the PEI, monitor every *n*-th paging occasion in a sequence of *m* paging occasions.

35. A wireless device (110) adapted to perform any of the steps of Claims 1 to 13.

36. A network node (160) adapted to perform any of the steps of Claims 14 to 34.

37. A wireless device (110) comprising:

a memory (130) storing instructions; and

a processor (120) operable to execute the instructions to cause the wireless device to:

receive (1202), from a network node (160), a paging early indicator, PEI, configuration comprising an indication of a mapping of a PEI to a plurality of paging occasions;

receive (1204), from the network node, the PEI ; and

based on the mapping of the PEI to the plurality of paging occasions, monitor (1206) a shared channel for paging in one of the plurality of paging occasions if the received PEI indicates that the paging is intended for the UE.

38. A network node (160) comprising:

a memory (180) storing instructions; and

a processor (170) operable to execute the instructions to cause the network node to:

transmit (1502), to at least one wireless device (110), a paging early indicator, PEI, configuration comprising an indication of a mapping of a first PEI to a plurality of paging occasions; and

based on the mapping, transmit (1504) the PEI to the at least one wireless device to trigger monitoring of a shared channel for paging in one of the plurality of paging occasions by the at least one wireless device, wherein the paging is intended for the at least one wireless device.