

CLAIMS

1. A method for wireless communications by a user equipment (UE), comprising:
 - receiving a Type0-physical downlink control channel (PDCCH) common search space control resource set (CORESET) configuration and a physical resource block (PRB) grid offset in a synchronization signal block (SSB), the Type0-PDCCH common search space CORESET configuration comprising an indication indicative of one or more offset values corresponding to frequency locations of Type0-PDCCH common search space CORESET resource blocks (PRBs) relative to frequency locations of PRBs of the SSB;
 - aligning a PRB grid of the SSB with a PRB grid of the Type0-PDCCH common search space CORESET by applying the PRB grid offset;
 - mapping the indication to the one or more offset values using a mapping stored by the UE, wherein the mapping is based on a subcarrier spacing of the Type0-PDCCH common search space CORESET;
 - determining the frequency locations of the Type0-PDCCH common search space CORESET PRBs based on the one or more offset values and the frequency locations of the SSB PRBs; and
 - receiving a Type0-PDCCH in the Type0-PDCCH common search space CORESET.
2. The method of claim 1, wherein the Type0-PDCCH common search space CORESET and the SSB are time division multiplexed.
3. The method of claim 1, wherein the Type0-PDCCH common search space CORESET and the SSB are frequency division multiplexed.
4. The method of claim 1, wherein the indication indicative of one or more offset values is further indicative of a bandwidth of the Type0-PDCCH common search space CORESET.
5. The method of claim 1, wherein each of the one or more offset values is based on at least

one of an offset step size, a bandwidth of the Type0-PDCCH common search space CORESET, or the subcarrier spacing of the Type0-PDCCH common search space CORESET.

6. The method of claim 5, wherein the offset step size depends on at least one of the bandwidth of the Type0-PDCCH common search space CORESET, a subcarrier spacing of the SSB, or the subcarrier spacing of the Type0-PDCCH common search space CORESET.

7. The method of claim 1, wherein the mapping comprises a hash function.

8. The method of claim 1, wherein an offset value of the one or more offset values indicates an offset value of zero, and wherein an offset value of zero indicates that a smallest PRB of the SSB PRBs has a same frequency as a smallest PRB of the Type0-PDCCH common search space CORESET PRBs after the aligning.

9. An apparatus, comprising:

a memory comprising executable instructions; and

a processor in data communication with the memory and configured to execute the instructions to cause the apparatus to:

receive a Type0-physical downlink control channel (PDCCH) common search space control resource set (CORESET) configuration and a physical resource block (PRB) grid offset in a synchronization signal block (SSB), the Type0-PDCCH common search space CORESET configuration comprising an indication indicative of one or more offset values corresponding to frequency locations of Type0-PDCCH common search space CORESET resource blocks (PRBs) relative to frequency locations of PRBs of the SSB;

align a PRB grid of the SSB with a PRB grid of the Type0-PDCCH common search space CORESET by applying the PRB grid offset;

map the indication to the one or more offset values using a mapping stored by the apparatus, wherein the mapping is based on a subcarrier spacing of the Type0-PDCCH

common search space CORESET;

determine the frequency locations of the Type0-PDCCH common search space CORESET PRBs based on the one or more offset values and the frequency locations of the SSB PRBs; and

receive a Type0-PDCCH in the Type0-PDCCH common search space CORESET.

10. The apparatus of claim 9, wherein the Type0-PDCCH common search space CORESET and the SSB are time division multiplexed.
11. The apparatus of claim 9, wherein the Type0-PDCCH common search space CORESET and the SSB are frequency division multiplexed.
12. The apparatus of claim 9, wherein the indication indicative of one or more offset values is further indicative of a bandwidth of the Type0-PDCCH common search space CORESET.
13. The apparatus of claim 9, wherein each of the one or more offset values is based on at least one of an offset step size, a bandwidth of the Type0-PDCCH common search space CORESET, or the subcarrier spacing of the Type0-PDCCH common search space CORESET.
14. The apparatus of claim 13, wherein the offset step size depends on at least one of the bandwidth of the Type0-PDCCH common search space CORESET, a subcarrier spacing of the SSB, or the subcarrier spacing of the Type0-PDCCH common search space CORESET.
15. The apparatus of claim 9, wherein the mapping comprises a hash function.
16. The apparatus of claim 9, wherein an offset value of the one or more offset values indicates an offset value of zero, and wherein an offset value of zero indicates that a smallest PRB of the SSB PRBs has a same frequency as a smallest PRB of the Type0-PDCCH common search space CORESET PRBs after the aligning.

17. An apparatus, comprising:

means for receiving a Type0-physical downlink control channel (PDCCH) common search space control resource set (CORESET) configuration and a physical resource block (PRB) grid offset in a synchronization signal block (SSB), the Type0-PDCCH common search space CORESET configuration comprising an indication indicative of one or more offset values corresponding to frequency locations of Type0-PDCCH common search space CORESET resource blocks (PRBs) relative to frequency locations of PRBs of the SSB;

means for aligning a PRB grid of the SSB with a PRB grid of the Type0-PDCCH common search space CORESET by applying the PRB grid offset;

means for mapping the indication to the one or more offset values using a mapping stored by the apparatus, wherein the mapping is based on a subcarrier spacing of the Type0-PDCCH common search space CORESET;

means for determining the frequency locations of the Type0-PDCCH common search space CORESET PRBs based on the one or more offset values and the frequency locations of the SSB PRBs; and

means for receiving a Type0-PDCCH in the Type0-PDCCH common search space CORESET.

18. The apparatus of claim 17, wherein the Type0-PDCCH common search space CORESET and the SSB are time division multiplexed.

19. The apparatus of claim 17, wherein the Type0-PDCCH common search space CORESET and the SSB are frequency division multiplexed.

20. The apparatus of claim 17, wherein the indication indicative of one or more offset values is further indicative of a bandwidth of the Type0-PDCCH common search space CORESET.

21. The apparatus of claim 17, wherein each of the one or more offset values is based on at

least one of an offset step size, a bandwidth of the Type0-PDCCH common search space CORESET, or the subcarrier spacing of the Type0-PDCCH common search space CORESET.

22. The apparatus of claim 21, wherein the offset step size depends on at least one of the bandwidth of the Type0-PDCCH common search space CORESET, a subcarrier spacing of the SSB, or the subcarrier spacing of the Type0-PDCCH common search space CORESET.

23. A non-transitory computer readable medium having instructions stored thereon that, when executed by a user equipment (UE), cause the UE to:

receive a Type0-physical downlink control channel (PDCCH) common search space control resource set (CORESET) configuration and a physical resource block (PRB) grid offset in a synchronization signal block (SSB), the Type0-PDCCH common search space CORESET configuration comprising an indication indicative of one or more offset values corresponding to frequency locations of Type0-PDCCH common search space CORESET resource blocks (PRBs) relative to frequency locations of PRBs of the SSB;

align a PRB grid of the SSB with a PRB grid of the Type0-PDCCH common search space CORESET by applying the PRB grid offset;

map the indication to the one or more offset values using a mapping stored by the UE, wherein the mapping is based on a subcarrier spacing of the Type0-PDCCH common search space CORESET;

determine the frequency locations of the Type0-PDCCH common search space CORESET PRBs based on the one or more offset values and the frequency locations of the SSB PRBs; and

receive a Type0-PDCCH in the Type0-PDCCH common search space CORESET.

24. The non-transitory computer readable medium of claim 23, wherein the Type0-PDCCH common search space CORESET and the SSB are time division multiplexed.

25. The non-transitory computer readable medium of claim 23, wherein the Type0-PDCCH

common search space CORESET and the SSB are frequency division multiplexed.

26. The non-transitory computer readable medium of claim 23, wherein the indication indicative of one or more offset values is further indicative of a bandwidth of the Type0-PDCCH common search space CORESET.

27. The non-transitory computer readable medium of claim 23, wherein each of the one or more offset values is based on at least one of an offset step size, a bandwidth of the Type0-PDCCH common search space CORESET, or the subcarrier spacing of the Type0-PDCCH common search space CORESET.

28. The non-transitory computer readable medium of claim 27, wherein the offset step size depends on at least one of the bandwidth of the Type0-PDCCH common search space CORESET, a subcarrier spacing of the SSB, or the subcarrier spacing of the Type0-PDCCH common search space CORESET.

29. A method for wireless communications by a user equipment (UE), comprising:
determining frequency locations of Type0-physical downlink control channel (PDCCH) common search space control resource set (CORESET) in a synchronization signal block (SSB) based on a mapping based on a subcarrier spacing of the Type0-PDCCH common search space CORESET;

determining frequency locations of Type0a-physical downlink control common search space CORESET in the SSB based on the frequency locations of the Type0-PDCCH common search space CORESET; and

receiving the Type0a-PDCCH common search space CORESET.

30. The method of claim 29, wherein determining the frequency locations of Type0-PDCCH common search space CORESET further comprises:

receiving a Type0-PDCCH common search space CORESET configuration and a

physical resource block (PRB) grid offset in the SSB, the Type0-PDCCH common search space CORESET configuration comprising an indication indicative of one or more offset values corresponding to frequency locations of Type0-PDCCH common search space CORESET resource blocks (PRBs) relative to frequency locations of PRBs of the SSB;

aligning a PRB grid of the SSB with a PRB grid of the Type0-PDCCH common search space CORESET by applying the PRB grid offset;

mapping the indication to the one or more offset values using the mapping stored by the UE; and

determining the frequency locations of the Type0-PDCCH common search space CORESET PRBs based on the one or more offset values and the frequency locations of the SSB PRBs.

31. A method for wireless communications by a base station (BS), comprising:

transmitting a synchronization signal block (SSB) to a user equipment (UE), the SSB having a Type0-physical downlink control channel (PDCCH) common search space control resource set (CORESET) configuration and a physical resource block (PRB) grid offset, the Type0-PDCCH common search space CORESET configuration comprising an indication indicative of one or more offset values corresponding to frequency locations of Type0-PDCCH common search space CORESET resource blocks (PRBs) relative to frequency locations of PRBs of the SSB, wherein the indication is mapped to the one or more offset values based on a subcarrier spacing of the Type0-PDCCH common search space CORESET;

transmitting a Type0-PDCCH in the Type0-PDCCH common search space CORESET for reception by the UE.

32. The method of claim 31, wherein the Type0-PDCCH common search space CORESET and the SSB are time division multiplexed.

33. The method of claim 31, wherein the Type0-PDCCH common search space CORESET and the SSB are frequency division multiplexed.

34. The method of claim 31, wherein the indication indicative of one or more offset values is further indicative of a bandwidth of the Type0-PDCCH common search space CORESET.

35. The method of claim 31, wherein each of the one or more offset values is based on at least one of an offset step size, a bandwidth of the Type0-PDCCH common search space CORESET, or the subcarrier spacing of the Type0-PDCCH common search space CORESET.

36. The method of claim 35, wherein the offset step size depends on at least one of the bandwidth of the Type0-PDCCH common search space CORESET, a subcarrier spacing of the SSB, or the subcarrier spacing of the Type0-PDCCH common search space CORESET.

37. An apparatus, comprising:

a memory comprising executable instructions; and

a processor in data communication with the memory and configured to execute the instructions to cause the apparatus to:

transmit a synchronization signal block (SSB) to a user equipment (UE), the SSB having a Type0-physical downlink control channel (PDCCH) common search space control resource set (CORESET) configuration and a physical resource block (PRB) grid offset, the Type0-PDCCH common search space CORESET configuration comprising an indication indicative of one or more offset values corresponding to frequency locations of Type0-PDCCH common search space CORESET resource blocks (PRBs) relative to frequency locations of PRBs of the SSB, wherein the indication is mapped to the one or more offset values based on a subcarrier spacing of the Type0-PDCCH common search space CORESET; and

transmit a Type0-PDCCH in the Type0-PDCCH common search space CORESET for reception by the UE.

38. The apparatus of claim 37, wherein the Type0-PDCCH common search space CORESET and the SSB are time division multiplexed.
39. The apparatus of claim 37, wherein the Type0-PDCCH common search space CORESET and the SSB are frequency division multiplexed.
40. The apparatus of claim 37, wherein the indication indicative of one or more offset values is further indicative of a bandwidth of the Type0-PDCCH common search space CORESET.
41. The apparatus of claim 37, wherein each of the one or more offset values is based on at least one of an offset step size, a bandwidth of the Type0-PDCCH common search space CORESET, or the subcarrier spacing of the Type0-PDCCH common search space CORESET.
42. The apparatus of claim 41, wherein the offset step size depends on at least one of the bandwidth of the Type0-PDCCH common search space CORESET, a subcarrier spacing of the SSB, or the subcarrier spacing of the Type0-PDCCH common search space CORESET.
43. An apparatus, comprising:
 means for transmitting a synchronization signal block (SSB) to a user equipment (UE), the SSB having a Type0-physical downlink control channel (PDCCH) common search space control resource set (CORESET) configuration and a physical resource block (PRB) grid offset, the Type0-PDCCH common search space CORESET configuration comprising an indication indicative of one or more offset values corresponding to frequency locations of Type0-PDCCH common search space CORESET resource blocks (PRBs) relative to frequency locations of PRBs of the SSB, wherein the indication is mapped to the one or more offset values based on a subscriber spacing of the Type0-PDCCH common search space CORESET; and
 means for transmitting a Type0-PDCCH in the Type0-PDCCH common search space CORESET for reception by the UE.

44. The apparatus of claim 43, wherein the Type0-PDCCH common search space CORESET and the SSB are time division multiplexed.
45. The apparatus of claim 43, wherein the Type0-PDCCH common search space CORESET and the SSB are frequency division multiplexed.
46. The apparatus of claim 43, wherein the indication indicative of one or more offset values is further indicative of a bandwidth of the Type0-PDCCH common search space CORESET.
47. The apparatus of claim 43, wherein each of the one or more offset values is based on at least one of an offset step size, a bandwidth of the Type0-PDCCH common search space CORESET, or the subcarrier spacing of the Type0-PDCCH common search space CORESET.
48. The apparatus of claim 47, wherein the offset step size depends on at least one of the bandwidth of the Type0-PDCCH common search space CORESET, a subcarrier spacing of the SSB, or the subcarrier spacing of the Type0-PDCCH common search space CORESET.
49. A non-transitory computer readable medium having instructions stored thereon that, when executed by a base station (BS), cause the BS to:

transmit a synchronization signal block (SSB) to a user equipment (UE), the SSB having a Type0-physical downlink control channel (PDCCH) common search space control resource set (CORESET) configuration and a physical resource block (PRB) grid offset, the Type0-PDCCH common search space CORESET configuration comprising an indication indicative of one or more offset values corresponding to frequency locations of Type0-PDCCH common search space CORESET resource blocks (PRBs) relative to frequency locations of PRBs of the SSB, wherein the indication is mapped to the one or more offset values based on a subcarrier spacing of the Type0-PDCCH common search space CORESET; and

transmit a Type0-PDCCH in the Type0-PDCCH common search space CORESET for reception by the UE.

50. The non-transitory computer readable medium of claim 49, wherein the Type0-PDCCH common search space CORESET and the SSB are time division multiplexed.

51. The non-transitory computer readable medium of claim 49, wherein the Type0-PDCCH common search space CORESET and the SSB are frequency division multiplexed.

52. The non-transitory computer readable medium of claim 49, wherein the indication indicative of one or more offset values is further indicative of a bandwidth of the Type0-PDCCH common search space CORESET.

53. The non-transitory computer readable medium of claim 49, wherein each of the one or more offset values is based on at least one of an offset step size, a bandwidth of the Type0-PDCCH common search space CORESET, or the subcarrier spacing of the Type0-PDCCH common search space CORESET.

54. The non-transitory computer readable medium of claim 53, wherein the offset step size depends on at least one of the bandwidth of the Type0-PDCCH common search space CORESET, a subcarrier spacing of the SSB, or the subcarrier spacing of the Type0-PDCCH common search space CORESET.