WHAT IS CLAIMED IS:

1. A method comprising:

receiving, by a user equipment (UE) from a base station, a punctured synchronization signal block (SSB) in a channel of a frequency band, wherein

the punctured SSB comprises a primary synchronization signal (PSS), a secondary synchronization signal (SSS), and a punctured physical broadcast channel (PBCH) obtained from a first PBCH of a first SSB by applying a first puncture pattern to reduce a first number of resource blocks (RBs) of the first PBCH to a second number of RBs for transmission,

the PSS of the punctured SSB has a center frequency indicated by a first sync raster location of a first set of sync raster locations associated with the frequency band, and

the first puncture pattern is associated with the first sync raster location; and

detecting, by the UE, the punctured SSB according to the first sync raster location.

2. The method of claim 1, wherein the punctured SSB has a bandwidth not larger than a bandwidth of the channel, and the first SSB has a bandwidth exceeding the bandwidth of the channel.

3. The method of claim 1 or 2, wherein a difference between the bandwidth of the first SSB and the bandwidth of the punctured SSB is related to the second number of RBs transmitted.

4. The method of any one of claims 1-3, further comprising:

determining, by the UE, attributes of the channel based on the received punctured PBCH in the punctured SSB, the attributes comprising a starting frequency location of the channel.

5. The method of claim 4, wherein determining the attributes of the channel comprises:

determining, by the UE, the starting frequency location of the channel based on the received punctured PBCH, the center frequency of the PSS of the punctured SSB and the first puncture pattern.

6. The method of claim 4, wherein determining the attributes of the channel comprises:

determining, by the UE, the starting frequency location of the channel based on the received punctured PBCH, a frequency location of a RB occupied by the PSS of the punctured SSB, and an offset with respect to the frequency location of the RB.

7. The method of any one of claims 1-6, wherein the PSS of the first SSB has a center frequency indicated by a second sync raster location of a second set of sync raster locations.

8. The method of claim 7, wherein frequencies of the first set of sync raster locations are based on a first raster spacing and a first set of shift spacings, and frequencies of the second set of sync raster locations are based on a second raster spacing and a second set of shift spacings.

9. The method of claim 8, wherein the first raster spacing is different from the second raster spacing, and the first raster spacing is related to a channel raster location of the channel.

10. The method of claim 8 or 9, wherein the second raster spacing is a multiple of the first raster spacing.

11. The method of any one of claims 8-10, wherein one or more shift spacings of the first set of shift spacings are different from one or more shift spacings of the second set of shift spacings.

12. The method of claim 7, wherein the first set of sync raster locations is obtained by shifting the second set of sync raster locations in a frequency domain.

13. The method of any one of claims 1-12, wherein a bandwidth of the channel is less than or equal to 5MHz.

14. The method of any one of claims 1-13, wherein a frequency span of the first SSB is 20 RBs.

15. The method of any one of claims 1-14, wherein the first set of sync raster locations comprises a third sync raster location associated with a second puncture pattern.

16. A method comprising:

generating, by a base station, a punctured synchronization signal block (SSB) for a channel of a frequency band based on a first SSB having a first bandwidth exceeding a second bandwidth of the channel, wherein

the first SSB comprises a first physical broadcast channel (PBCH), a primary synchronization signal (PSS), and a secondary synchronization signal (SSS),

the punctured SSB comprises the PSS and the SSS, and a punctured PBCH obtained from the first PBCH by applying a first puncture pattern to reduce a first number of resource blocks (RBs) of the first PBCH to a second number of RBs for transmission,

the PSS of the punctured SSB has a center frequency indicated by a first sync raster location of a first set of sync raster locations associated with the frequency band, and

the first puncture pattern is associated with the first sync raster location; and

transmitting, by the base station, the punctured SSB in the channel.

17. The method of claim 16, wherein the punctured SSB has a third bandwidth not larger than the second bandwidth of the channel.

18. The method of claim 17, wherein a difference between the first bandwidth of the first SSB and the third bandwidth of the punctured SSB is related to the second number of RBs transmitted.

19. The method of any one of claims 16-18, wherein the punctured PBCH comprises information indicating attributes of the channel, the attributes comprising a starting frequency location of the channel.

20. A communication apparatus, comprising at least one processor and an interface circuit, wherein the interface circuit is configured to input or output instructions and/or data for the at least one processor, and when the at least one processor executes the instructions, the apparatus implements the method according to any one of claims 1 to 19.