

CLAIMS

What is claimed is:

1. A method for wireless communication at a user equipment (UE), comprising:
 - receiving, based at least in part on an occurrence of a triggering event associated with the UE, a trigger signal that identifies resources to be used for transmission of an aperiodic tracking reference signal (TRS);
 - receiving the aperiodic TRS based at least in part on the trigger signal and the identified resources; and
 - performing at least one of a tracking function, or a synchronization function, or an alignment function, or a combination thereof, in response to the occurrence of the triggering event and based at least in part on the aperiodic TRS.
2. The method of claim 1, wherein the aperiodic TRS comprises a channel state information reference signal (CSI-RS) for tracking that is separate from an aperiodic CSI-RS.
3. The method of claim 1, wherein the trigger signal is received in a downlink control indicator (DCI).
4. The method of claim 3, wherein the trigger signal carries at least one of a field indicating that the aperiodic TRS is triggered or a field indicating the triggering event, wherein the indication of the triggering event comprises the indication that the aperiodic TRS is triggered.
5. The method of claim 3, wherein the triggering event comprises at least one of a secondary cell activation event, or a bandwidth part switching event, or a beam change event, or a connected mode discontinuous reception event, or an idle mode discontinuous reception event, or a combination thereof.
6. The method of claim 3, further comprising:
 - receiving a synchronization signal block (SSB) transmission prior to the triggering event occurring.
7. The method of claim 3, further comprising:
 - receiving an uplink grant DCI that identifies the resources to be used for transmission of the aperiodic TRS.
8. The method of claim 7, further comprising:

decoding the uplink grant DCI to identify additional resources to be used for transmission of a channel state information reference signal.

9. The method of claim 3, further comprising:

receiving a downlink grant DCI that identifies the resources to be used for transmission of the aperiodic TRS.

10. The method of claim 9, further comprising:

decoding a first portion of bits of a downlink grant field of the downlink grant DCI to identify a zero grant or invalid grant; and

decoding a second portion bits of a second field to identify the indication that the aperiodic TRS has been triggered, the second field being different from the first portion of bits of the downlink grant field.

11. The method of claim 10, wherein the bits of the second field indicates that the triggering event has occurred, and the indication of the triggering event further indicates that the aperiodic TRS is triggered.

12. The method of claim 3, further comprising:

receiving the DCI in a same slot as the aperiodic TRS is received in.

13. The method of claim 3, further comprising:

receiving the DCI in a different slot from slot that the aperiodic TRS is received in.

14. The method of claim 3, wherein the DCI comprises at least one of a fallback DCI format or a non-fallback DCI format.

15. The method of claim 3, wherein the DCI comprises an indication of a transmission timing parameter associated with the aperiodic TRS.

16. The method of claim 1, wherein the trigger signal is received in a medium access control (MAC) control element (CE).

17. The method of claim 16, further comprising:

determining that a secondary cell has been activated based at least in part on the MAC CE.

18. The method of claim 17, wherein the aperiodic TRS is received a defined waiting period after the MAC CE.

19. The method of claim 16, further comprising:

determining that a beam change event has occurred based at least in part on the MAC CE.

20. The method of claim 16, wherein the triggering event comprises at least one of a secondary cell activation event, or a bandwidth part switching event, or a beam change event, or a connected mode discontinuous reception event, or an idle mode discontinuous reception event, or a combination thereof.

21. The method of claim 1, wherein the triggering event comprises a secondary cell activation, further comprising:
receiving the trigger signal from an active cell of the UE; and
receiving the aperiodic TRS from the secondary cell being activated in the secondary cell activation, wherein the resources identified in the trigger signal comprise secondary cell resources used for transmission of the aperiodic TRS.

22. The method of claim 1, wherein the triggering event comprises a bandwidth part switching event, further comprising:
receiving the trigger signal over an active bandwidth part of the UE; and
receiving the aperiodic TRS over a bandwidth part being activated in the bandwidth part switching event, wherein the activated bandwidth part is different from the active bandwidth part and wherein the resources identified in the trigger signal comprise activated bandwidth part resources used for transmission of the aperiodic TRS over the activated bandwidth part.

23. The method of claim 1, wherein the triggering event comprises a beam change event, further comprising:
receiving the trigger signal over an active beam of the UE; and
receiving the aperiodic TRS over a beam being activated in the beam change event, wherein the activated beam is different from the active beam and wherein the resources identified in the trigger signal comprise activated beam resources used for transmission of the aperiodic TRS over the activated beam.

24. A method for wireless communication at a user equipment (UE), comprising:
receiving a configuration signal that identifies one or more resources for transmission of an aperiodic tracking reference signal (TRS);
determining that a triggering event associated with the UE has occurred; and
receiving the aperiodic TRS based at least in part on the determining and according to the one or more resources.

25. The method of claim 24, further comprising:

receiving the aperiodic TRS during a paging occasion for the UE while the UE is operating in an idle mode discontinuous reception state, wherein occurrence of the paging occasion comprises the triggering event.

26. The method of claim 24, further comprising:

receiving the aperiodic TRS before an on duration of a connected mode discontinuous reception state;

determining, based at least in part on receiving the aperiodic TRS, that data is to be communicated to the UE; and

transitioning to an active state from the discontinuous reception state for the data communication.

27. The method of claim 24, wherein the one or more resources comprise a transmission timing parameter, the transmission timing parameter comprising a relative timing parameter for transmission of the aperiodic TRS after occurrence of the triggering event.

28. The method of claim 24, wherein the triggering event comprises at least one of a secondary cell activation event, or a bandwidth part switching event, or a beam change event, or a connected mode discontinuous reception event, or an idle mode discontinuous reception event, or a combination thereof.

29. An apparatus for wireless communication at a user equipment (UE), comprising:

means for receiving, based at least in part on an occurrence of a triggering event associated with the UE, a trigger signal that identifies resources to be used for transmission of an aperiodic tracking reference signal (TRS);

means for receiving the aperiodic TRS based at least in part on the trigger signal and the identified resources; and

means for performing at least one of a tracking function, or a synchronization function, or an alignment function, or a combination thereof, in response to the occurrence of the triggering event and based at least in part on the aperiodic TRS.

30. The apparatus of claim 29, wherein the aperiodic TRS comprises a channel state information reference signal (CSI-RS) for tracking that is separate from an aperiodic CSI-RS.

31. The apparatus of claim 29, wherein the trigger signal is received in a downlink control indicator (DCI).

32. The apparatus of claim 31, wherein the trigger signal carries at least one of a field indicating that the aperiodic TRS is triggered or a field indicating the triggering event, wherein the indication of the triggering event comprises the indication that the aperiodic TRS is triggered.

33. The apparatus of claim 31, wherein the triggering event comprises at least one of a secondary cell activation event, or a bandwidth part switching event, or a beam change event, or a connected mode discontinuous reception event, or an idle mode discontinuous reception event, or a combination thereof.

34. The apparatus of claim 31, further comprising:
means for receiving a synchronization signal block (SSB) transmission prior to the triggering event occurring.

35. The apparatus of claim 31, further comprising:
means for receiving an uplink grant DCI that identifies the resources to be used for transmission of the aperiodic TRS.

36. The apparatus of claim 35, further comprising:
means for decoding the uplink grant DCI to identify additional resources to be used for transmission of a channel state information reference signal.

37. The apparatus of claim 31, further comprising:
means for receiving a downlink grant DCI that identifies the resources to be used for transmission of the aperiodic TRS.

38. The apparatus of claim 37, further comprising:
means for decoding a first portion of bits of a downlink grant field of the downlink grant DCI to identify a zero grant or invalid grant; and
means for decoding a second portion bits of a second field to identify the indication that the aperiodic TRS has been triggered, the second field being different from the first portion of bits of the downlink grant field.

39. The apparatus of claim 38, wherein the bits of the second field indicates that the triggering event has occurred, and the indication of the triggering event further indicates that the aperiodic TRS is triggered.

40. The apparatus of claim 31, further comprising:
means for receiving the DCI in a same slot as the aperiodic TRS is received in.

41. The apparatus of claim 31, further comprising:
means for receiving the DCI in a different slot from slot that the aperiodic TRS is received in.
42. The apparatus of claim 31, wherein the DCI comprises at least one of a fallback DCI format or a non-fallback DCI format.
43. The apparatus of claim 31, wherein the DCI comprises an indication of a transmission timing parameter associated with the aperiodic TRS.
44. The apparatus of claim 29, wherein the trigger signal is received in a medium access control (MAC) control element (CE).
45. The apparatus of claim 44, further comprising:
means for determining that a secondary cell has been activated based at least in part on the MAC CE.
46. The apparatus of claim 45, wherein the aperiodic TRS is received a defined waiting period after the MAC CE.
47. An apparatus for wireless communication at a user equipment (UE), comprising:
means for receiving a configuration signal that identifies one or more resources for transmission of an aperiodic tracking reference signal (TRS);
means for determining that a triggering event associated with the UE has occurred; and
means for receiving the aperiodic TRS based at least in part on the determining and according to the one or more resources.
48. The apparatus of claim 47, further comprising:
means for receiving the aperiodic TRS during a paging occasion for the UE while the UE is operating in an idle mode discontinuous reception state, wherein occurrence of the paging occasion comprises the triggering event.