CLAIMS

1. A method of transmitting a reference signal, comprising:

determining, by a vehicle user equipment (UE), transmission configuration information of a synchronization signal block in a new radio-vehicle-to-everything (NR-V2X) system (VSSB), wherein the transmission configuration information comprises a transmission period of the VSSB, and a time domain position of a VSSB transmission time window within the transmission period;

transmitting, by the vehicle UE and according to the transmission configuration information, one or more VSSBs within the VSSB transmission time window that occurs periodically, and the one or more VSSBs comprises the VSSB;

wherein each of the one or more VSSBs comprises a primary sidelink synchronization signal (PSSS), a secondary sidelink synchronization signal (SSSS), a physical sidelink broadcast channel (PSBCH) signal, and a demodulation reference signal (DMRS);

wherein transmitting the one or more VSSBs within the VSSB transmission time window that occurs periodically comprises:

transmitting the PSBCH signal and the DMRS of each of the one or more VSSBs in a frequency division multiplexing (FDM) manner;

in response to N greater than l, determining VSSB index information for each of the one or more VSSBs, wherein N is a number of the one or more VSSBs and N is a positive integer; and

generating a target VSSB carrying the VSSB index information by loading the VSSB index information into a setting signal of a VSSB to be transmitted, wherein the setting signal comprises the PSBCH signal, the DMRS, or the PSBCH signal and the DMRS.

2. The method according to claim 1, wherein transmitting the one or more VSSBs within the VSSB transmission time window that occurs periodically comprises:

determining target carrier frequency information for transmitting the one or more VSSBs;

for each VSSB to be transmitted,

determining, according to the target carrier frequency information and current speed

information of the vehicle UE, a target reference signal time domain density for the VSSB to be transmitted;

determining transmission information for the VSSB to be transmitted according to the target reference signal time domain density, wherein the transmission information comprises a target subcarrier spacing for transmitting the VSSB and a structure of the VSSB to be transmitted, and the structure of the VSSB to be transmitted comprises a number of symbols occupied by each signal and a position of the occupied symbols; and

transmitting, according to the transmission information for the VSSB to be transmitted, the VSSB within the VSSB transmission time window.

3. The method according to claim 2, wherein determining the target carrier frequency information for transmitting the one or more VSSBs comprises:

receiving resource configuration information from a base station, wherein the resource configuration information is configured to instruct the vehicle UE to transmit the one or more VSSBs with configured resource; and

determining the target carrier frequency information according to the resource configuration information; or

determining the target carrier frequency information according to preset resource configuration information.

4. The method according to claim 2, wherein

the current speed information comprises a relative speed between the vehicle UE and a preset receiving terminal;

determining, according to the target carrier frequency information and the current speed information of the vehicle UE, the target reference signal time domain density for each VSSB to be transmitted, comprises:

obtaining a comparison result by comparing the relative speed with a preset speed threshold; and

determining the target reference signal time domain density according to the target

carrier frequency information and the comparison result.

5. The method according to claim 4, wherein determining the target reference signal time domain density according to the target carrier frequency information and the comparison result comprises:

in response to the comparison result indicating that the relative speed is greater than or equal to the preset speed threshold, increasing a reference signal time domain density at the target carrier frequency to a target reference signal time domain density corresponding to the comparison result.

6. The method according to claim 5, wherein increasing the reference signal time domain density at the target carrier frequency to the target reference signal time domain density corresponding to the comparison result is implemented through at least one of followings:

using a target VSSB structure, wherein a reference signal proportion in the target VSSB structure is greater than a reference signal proportion in an original VSSB structure, and the reference signal proportion is a ratio of a number of symbols occupied by the reference signal to a duration occupied by the VSSB; and

increasing a subcarrier spacing for transmitting the one or more VSSBs at the target carrier frequency.

7. The method according to claim 1, wherein transmitting the one or more VSSBs within the VSSB transmission time window that occurs periodically further comprises:

transmitting one or more target VSSBs through a plurality of beams within the VSSB transmission time window that occurs periodically, wherein the one or more target VSSBs comprise the target VSSB.

8. The method according to claim 1, wherein loading the VSSB index information into the setting signal of the VSSB to be transmitted is implemented through one of following acts:

indicating the VSSB index information by a corresponding DMRS target sequence;

loading the VSSB index information into a first bit of the PSBCH signal; and

indicating a part of bit values of the VSSB index information by the corresponding DMRS target sequence, and loading remaining of the bit values into a second bit of the preset PSBCH signal.

9. The method according to claim 1, wherein transmitting the one or more VSSBs within the VSSB transmission time window that occurs periodically further comprises:

transmitting the PSBCH signal and the DMRS of each of the one or more VSSBs in a time division multiplexing (TDM) manner.

10. A method of receiving a reference signal, comprising:

detecting, by a receiving terminal, a synchronization signal block in a new radio-vehicle-to-everything (NR-V2X) system (VSSB) transmitted from a vehicle user equipment (UE), wherein the VSSB comprises a primary sidelink synchronization signal (PSSS), a secondary sidelink synchronization signal (SSSS), a physical sidelink broadcast channel (PSBCH) signal, and a demodulation reference signal (DMRS), and the PSBCH signal and the DMRS of the VSSB are transmitted in a frequency division multiplexing (FDM) manner;

obtaining, by the receiving terminal, VSSB index information from a target VSSB detected;

determining, by the receiving terminal, a time domain position of the target VSSB according to the VSSB index information; and

performing, by the receiving terminal, a time domain synchronization with the vehicle UE according to the time domain position;

wherein obtaining the VSSB index information from the target VSSB detected comprises:

obtaining the PSSS, the SSSS, the PSBCH signal and the DMRS by analyzing the target VSSB; and

obtaining the VSSB index information from a setting signal, wherein the setting signal comprises at least one of the PSBCH signal and the DMRS.

11. The method according to claim 10, wherein detecting the VSSB transmitted from the vehicle UE comprises:

receiving resource configuration information from a base station, wherein the resource configuration information is configured to instruct the receiving terminal to receive the VSSB through configured resource;

determining, according to the resource configuration information, target carrier frequency information for receiving the VSSB;

determining a detecting subcarrier spacing according to the target carrier frequency information; and

detecting the VSSB at a target frequency band with each detecting subcarrier spacing.

12. The method according to claim 10, wherein obtaining the VSSB index information from the setting signal comprises one of following acts:

obtaining the VSSB index information from information carried by a setting DMRS sequence; and

obtaining the VSSB index information by analyzing bits of a setting PSBCH signal.

13. The method according to claim 10, wherein obtaining the VSSB index information from the setting signal comprises:

obtaining a part of bit values of the VSSB index information from information carried by a setting DMRS sequence;

obtaining remaining of the bit values of the VSSB index information from bits of a setting PSBCH signal; and

determining the VSSB index information according to complete bit values composed of the part of the bit values and the remaining of the bit values.

14. The method according to claim 11, wherein determining the time domain position of the VSSB according to the VSSB index information comprises:

determining the time domain position of the target VSSB according to the VSSB index information, the target carrier frequency information, and a target subcarrier spacing; wherein the target subcarrier spacing indicates a detecting subcarrier spacing used to detect the target VSSB.

15. A vehicle user equipment (UE), comprising:

a processor;

a memory, configured to store instructions executable by the processor;

wherein the processor is configured to:

determine transmission configuration information of a synchronization signal block in a new radio-vehicle-to-everything (NR-V2X) system (VSSB), wherein the transmission configuration information comprises a transmission period of the VSSB, and a time domain position of a VSSB transmission time window within the transmission period;

transmit one or more VSSBs within the VSSB transmission time window that occurs periodically according to the transmission configuration information, where the one or more VSSBs comprise the VSSB;

wherein each VSSB comprises: a primary sidelink synchronization signal (PSSS), a secondary sidelink synchronization signal (SSSS), a physical sidelink broadcast channel (PSBCH) signal, and a demodulation reference signal (DMRS);

wherein transmitting the one or more VSSBs within the VSSB transmission time window that occurs periodically comprises:

transmitting the PSBCH signal and the DMRS of each of the one or more VSSBs in a frequency division multiplexing (FDM) manner;

in response to N greater than l, determining VSSB index information for each of the one or more VSSBs, wherein N is a number of the one or more VSSBs and N is a positive integer; and

generating a target VSSB carrying the VSSB index information by loading the VSSB index information into a setting signal of a VSSB to be transmitted, wherein the setting signal comprises the PSBCH signal, the DMRS, or the PSBCH signal and the DMRS.

16. A terminal, comprising:

a processor;

a memory, configured to store instructions executable by the processor;

wherein when the instructions are executed, the processor is configured to:

detect a synchronization signal block of a new radio-vehicle-to-everything (NR-V2X) system (VSSB) transmitted from a vehicle user equipment (UE), wherein the VSSB comprises a primary sidelink synchronization signal (PSSS), a secondary sidelink synchronization signal (SSSS), a physical sidelink broadcast channel (PSBCH) signal, and a demodulation reference signal (DMRS), and the PSBCH signal and the DMRS of the VSSB are transmitted in a frequency division multiplexing (FDM) manner;

obtain VSSB index information from a target VSSB detected;

determine a time domain position of the target VSSB according to the VSSB index information; and

perform a time domain synchronization with the vehicle UE according to the time domain position;

wherein obtaining the VSSB index information from the target VSSB detected comprises:

obtaining the PSSS, the SSSS, the PSBCH signal and the DMRS by analyzing the target VSSB; and

obtaining the VSSB index information from a setting signal, wherein the setting signal comprises at least one of the PSBCH signal and the DMRS.