

【CLAIMS】

【Claim 1】 A method of performing device-to-device (D2D) communication by a user equipment (UE) in a wireless communication system, the method comprising:

detecting a D2D synchronization signal from at least one synchronization source;

measuring a D2D reference signal received through a same subframe in which the D2D synchronization signal is detected; and

selecting a synchronization reference UE from the at least one synchronization source depending on whether a predetermined condition is satisfied,

wherein the predetermined condition is satisfied when a result of measuring the D2D reference signal satisfies a threshold and the UE succeeds in obtaining an information element of a D2D channel associated with the D2D reference signal satisfying the threshold, and

wherein when the synchronization reference UE is selected, a D2D synchronization signal and an information element of a D2D channel to be transmitted by the UE are determined based on the D2D synchronization signal and the information element of the D2D channel which are received from the synchronization reference UE.

【Claim 2】 The method according to claim 1, wherein measuring the D2D reference signal includes measuring an average of received powers of resources, on which a D2D demodulation reference signal (DMRS) for demodulation of the D2D channel is transmitted.

【Claim 3】 The method according to claim 1, further comprising:

transmitting the D2D synchronization signal of the UE and the information element of a D2D channel of the UE, at least part of the D2D synchronization signal of the UE being configured the same as the D2D synchronization signal received from the synchronization reference UE, and at least part of the information element of the D2D channel of the UE being configured the same as the information element of the D2D channel received from the synchronization reference UE.

【Claim 4】 The method according to claim 1,

wherein when the predetermined condition is not satisfied and the synchronization reference UE is not selected, the UE performs D2D communication at timing of the UE itself and,

wherein when the predetermined condition is satisfied and the synchronization reference UE is selected, the UE performs D2D communication based on timing of the selected synchronization reference UE.

【Claim 5】 The method according to claim 1, further comprising:

transmitting, by UE, a D2D synchronization signal of the UE itself based on pre-configuration of a base station, when the predetermined condition is not satisfied, the synchronization reference UE is not selected and the UE is out of coverage.

【Claim 6】 The method according to claim 1, wherein the UE performs D2D communication based on signaling from a base station when the UE is changed from out-of-coverage to in-coverage.

【Claim 7】 A method of performing device-to-device (D2D) communication by a user equipment (UE) in a wireless communication system, the method comprising:

detecting a D2D synchronization signal from at least one synchronization source;

measuring a D2D reference signal received through a same subframe in which the D2D synchronization signal is detected; and

selecting a synchronization reference UE from the at least one synchronization source depending on whether a predetermined condition is satisfied,

wherein the predetermined condition is satisfied when a result of measuring the D2D reference signal satisfies a threshold and an information element of a D2D channel associated with the D2D reference signal satisfying the threshold is acquired, and

wherein detecting the D2D synchronization signal includes: detecting a sequence of a primary D2D synchronization signal (PD2DSS) which is repeatedly mapped to at least two symbols based on one of a plurality of root indices for a Zadoff-Chu sequence.

【Claim 8】 The method according to claim 7, wherein a first root index of the plurality of root indices corresponds to in-coverage and a second root index of the plurality of root indices corresponds to out-of-coverage.

【Claim 9】 The method according to claim 1, wherein the information element of the D2D channel includes a bandwidth for D2D communication broadcasted through the D2D channel, a D2D frame number, a D2D subframe number and uplink (UL)-downlink (DL) configuration information in a case of time division duplex (TDD).

【Claim 10】 A user equipment (UE) for performing device-to-device (D2D) communication, the UE comprising:

a receiver configured to receive a D2D synchronization signal from at least one synchronization source; and

a processor configured to measure a D2D reference signal received through a same subframe in which the D2D synchronization signal is received and to select a synchronization reference UE from the at least one synchronization source depending on whether a predetermined condition is satisfied,

wherein the predetermined condition is satisfied when a result of measuring the D2D reference signal satisfies a threshold and the processor succeeds in obtaining an information element of a D2D channel associated with the D2D reference signal satisfying the threshold, and

wherein when the synchronization reference UE is selected, a D2D synchronization signal and an information element of a D2D channel to be transmitted by the UE are determined based on the D2D synchronization signal and the information element of the D2D channel which are received from the synchronization reference UE.

【Claim 11】 The UE according to claim 10, wherein the processor signal measures an average of received powers of resources, on which a D2D demodulation reference signal (DMRS) for demodulation of the D2D channel is transmitted.

【Claim 12】 The UE according to claim 10, further comprising a transmitter configured to transmit the D2D synchronization signal of the UE and the information element of a D2D channel of the UE, at least part of the D2D synchronization signal of the UE being configured the same as the D2D synchronization signal received from the synchronization reference UE, and at least part of the information element of the D2D channel of the UE being configured the same as the information element of the D2D channel received from the synchronization reference UE.

【Claim 13】 The UE according to claim 10,
wherein when the predetermined condition is not satisfied and the synchronization reference UE is not selected, the UE performs D2D communication at timing of the UE itself and,

wherein when the predetermined condition is satisfied and the synchronization reference UE is selected, the UE performs D2D communication based on timing of the selected synchronization reference UE.

【Claim 14】 The UE according to claim 10, further comprising a transmitter configured to transmit a D2D synchronization signal of the UE itself based on pre-configuration of a base station, when the predetermined condition is not satisfied, the synchronization reference UE is not selected and the UE is out of coverage.

【Claim 15】 The UE according to claim 10, wherein the UE performs D2D communication based on signaling from a base station when the UE is changed from out-of-coverage to in-coverage.