[0006] NPL 1 3GPP TR 36.843 V12.0.0 (March 2014)

Summary

Technical Problem

[0007] In Non Patent Literature 1, a method of a terminal device recognizing radio resources available for D2D communication is not disclosed.

[0008] For example, radio resources (a resource pool) available for D2D communication are selected by a base station in the case of in-coverage and is selected by a representative terminal device in the case of out-of-coverage.

[0009] In the case of in-coverage, the base station may notify the terminal device of the radio resources available for D2D communication. However, when the base station freely selects the radio resources available for D2D communication without constraints, the base station may use many radio resources in order to notify the radio resources available for D2D communication. As a result, from the viewpoint of the radio resources, a load on the base station may become large.

[0010] In the case of out-of-coverage, the representative terminal device may notify another terminal device of the radio resources available for D2D communication. However, since the other terminal device does not recognize radio resources that are used by the representative terminal device to notify the radio resources available for D2D communication, a trial and error search (for example, a synchronization signal and/or synchronization information (information of synchronization) is detected by trial and error) may be performed. As a result, a load on the other terminal device may become large. In addition, similar to the case of in-coverage, in the case of out-of-coverage, from the viewpoint of the radio resources, a load on the representative terminal device may become large.

[0011] Therefore, it is preferable to provide a mechanism in which a load necessary for a terminal device to recognize the radio resources available for D2D communication can be reduced.

Solution to Problem

[0011a] According to a first aspect of the present invention, there is provided a device comprising: circuitry configured to acquire information indicating one or more resource pools serving as radio resources available for device-to-device communication; and notify a terminal device of the one or more resource pools, wherein the one or more resource pools are resource pools that are selected from among a resource pool set including multiple resource pools, which are determined in advance as candidates for radio resources available for device-to-device communication, and the multiple resource pools include an in-coverage resource pool serving as a radio resource available for device-to-device communication within a network coverage area and an out-of-coverage resource pool serving as a radio

resource available for device-to-device communication outside of the network coverage area, a usage of the in-coverage resource pool and the out-of-coverage resource pool being based on reception power at the terminal device.

[0011b] According to a second aspect of the present invention, there is provided a device comprising: circuitry configured toacquire information indicating one or more resource pools serving as radio resources available for device-to-device communication; and control device-to-device communication by a terminal device in at east one resource pool among the one or more resource pools, wherein the one or more resource pools are resource pools that are selected from among a resource pool set including multiple resource pools, which are determined in advance as candidates for radio resources available for device-to-device communication, and the multiple resource pools include an in-coverage resource pool serving as a radio resource available for device-to-device communication within a network coverage area and an out-of-coverage resource pool serving as a radio resource available for device-to-device communication outside of the network coverage area, a usage of the in-coverage resource pool and the out-of-coverage resource pool being based on reception power at the terminal device.

[0011c] According to a third aspect of the present invention, there is provided a device comprising: circuitry configured to acquire information indicating a change in a resource pool serving as a radio resource available for device-to-device communication; and notify a terminal device of the change in a primary resource pool among one or more resource pools serving as radio resources available for device-to-device communication, wherein the one or more resource pools include an in-coverage resource pool serving as a radio resource available for device-to-device communication within a network coverage area and an out-of-coverage resource pool serving as a radio resource available for device-to-device communication outside of the network coverage area, an usage of the in-coverage resource pool and the out-of-coverage resource pool being based on reception power at the terminal device.

[0012] Disclosed herein is a device including: an acquisition unit configured to acquire information indicating one or more resource pools serving as radio resources available for device-to-device communication; and a control unit configured to notify a terminal device of the one or more resource pools. The one or more resource pools are resource pools that are selected from among a resource pool set including multiple resource pools, which are determined in advance as candidates for radio resources available for device-to-device communication.

[0013]

Claims

1. A device comprising:

circuitry configured to acquire information indicating one or more resource pools serving as radio resources available for device-to-device communication; and

notify a terminal device of the one or more resource pools,

wherein the one or more resource pools are resource pools that are selected from among a resource pool set including multiple resource pools, which are determined in advance as candidates for radio resources available for device-to-device communication, and

the multiple resource pools include an in-coverage resource pool serving as a radio resource available for device-to-device communication within a network coverage area and an out-of-coverage resource pool serving as a radio resource available for device-to-device communication outside of the network coverage area, a usage of the in-coverage resource pool and the out-of-coverage resource pool being based on reception power at the terminal device.

2. The device according to claim 1, wherein the device is a base station, a base station device for the base station, or a module for the base station device.

3. The device according to claim 2, wherein the circuitry is further configured to notify the terminal device of the one or more resource pools by reporting system information indicating the one or more resource pools.

4. The device according to claim 1, wherein the device is another terminal device or a module for the other terminal device.

5. The device according to claim 4, wherein the circuitry is further configured to notify the terminal device of the one or more resource pools in each of the one or more resource pools.

6. The device according to claim 4, wherein the circuitry is further configured to notify the terminal device of the one or more resource pools in a predetermined resource pool included in the resource pool set.

7. The device according to claim 4, wherein the circuitry is configured to control transmission of synchronization information in each of the one or more resource pools.

8. The device according to claim 1,

wherein each of the multiple resource pools includes identification information for identifying itself, and

wherein the circuitry is further configured to notify the terminal device of the one or more resource pools by transmission of the identification information of each of the one or more resource pools.

9. A device comprising:

circuitry configured to

acquire information indicating one or more resource pools serving as radio resources available for device-to-device communication; and

control device-to-device communication by a terminal device in at east one resource pool among the one or more resource pools,

wherein the one or more resource pools are resource pools that are selected from among a resource pool set including multiple resource pools, which are determined in advance as candidates for radio resources available for device-to-device communication, and

the multiple resource pools include an in-coverage resource pool serving as a radio resource available for device-to-device communication within a network coverage area and an out-of-coverage resource pool serving as a radio resource available for device-to-device communication outside of the network coverage area, a usage of the in-coverage resource pool and the out-of-coverage resource pool being based on reception power at the terminal device.

10. The device according to claim 9, wherein the one or more resource pools are resource pools of which a base station or another terminal device notifies the terminal device.

11. The device according to claim 10,

wherein the information indicating the one or more resource pools is information that is transmitted along with synchronization information by the another terminal device in each of the one or more resource pools, and

wherein the circuitry is further configured to acquire the information indicating the one or more resource pools from information received by the terminal device in the resource pool in which the synchronization information is detected by the terminal device and which is included in the resource pool set.

12. The device according to claim 10,

wherein the one or more resource pools are resource pools of which the another terminal device notifies the terminal device in a predetermined resource pool included in the resource pool set, and

wherein the circuitry is further configured to acquire the information indicating the one or more resource pools from information received by the terminal device in the predetermined resource pool.

13. A device comprising:

circuitry configured to

acquire information indicating a change in a resource pool serving as a radio resource available for device-to-device communication; and

notify a terminal device of the change in a primary resource pool among one or more resource pools serving as radio resources available for device-to-device communication,

wherein the one or more resource pools include an in-coverage resource pool serving as a radio resource available for device-to-device communication within a network coverage area and an out-of-coverage resource pool serving as a radio resource available for device-to-device communication outside of the network coverage area, an usage of the in-coverage resource pool and the out-of-coverage resource pool being based on reception power at the terminal device.

14. The device according to claim 13, wherein the change includes deleting the resource pool, adding the resource pool, changing the primary resource pool, or changing an application of device-to-device communication performed in the resource pool.

15. The device according to claim 13, wherein the circuitry is further configured to notify the terminal device of the primary resource pool.

16. The device according to claim 1, wherein each of the multiple resource pools is associated with a predetermined priority.

17. The device according to claim 16, wherein the predetermined priority is related to an application served by each resource pool.

18. The device according to claim 17, wherein the predetermined priority is related to an urgency level of the application.

19. The device according to claim 16, wherein the predetermined priority is referred to as a use case.