

the communication device of the secondary user is moved, the frequency does not always become a frequency which can be used in an area in a destination of the movement. In such a case, it becomes necessary to switch the frequency to be used during the movement through an interaction with the database, and as the number of times of switching is increased, it becomes disadvantageous when stably operating the communication.

PRIOR ART DOCUMENT

NON-PATENT DOCUMENT

[0005] Non-patent Document 1: IEEE802.11af Task Group,
<http://mentor.ieee.org/802.11/>

Non-patent Document 2: IEEE802.22 Working Group, <http://mentor.ieee.org/22/>

Non-patent Document 3: IEEE802.19.1 Task Group,
<http://mentor.ieee.org/802.802.19/documents>

Non-patent Document 4: Federal Communications Commission, Unlicensed Operation in the TV Broadcast Bands, Second Memorandum Opinion and Order, FCC, 10-17-4, Sept. 23, 2010.

Non-patent Document 5: Ofcom, Digital Dividend: Cognitive Access, Consultation on License Exempting Cognitive Devices using Interleaved Spectrum, July 2009.

SUMMARY OF THE INVENTION

PROBLEMS TO BE SOLVED BY THE INVENTION

[0006] ~~The~~Embodiments of the present invention ~~has an object to~~ provide, in a communication device being a terminal configured to operate under a television white space environment, a communication control method of the communication device, a database which provides information to the communication device, and a database control method, a communication device capable of selecting a use frequency in an advantageous manner even when it is moved, a communication control method of the communication device, a database which provides information to the

communication device, and a database control method.

MEANS FOR SOLVING THE PROBLEMS

[0007] ~~In order to solve the above problems, According to a first aspect of the present invention, there is provided a communication device as one aspect of the present invention is a communication device~~ having a communication function unit, the communication device including: a storing unit configured to store and retain region information indicating a range of movement planned for own device; a transmitting unit configured to transmit the region information to a database; a receiving unit configured to receive an available frequency information list indicating frequencies usable in common in an entire range indicated by the region information, the available frequency information list being sent from the database as information in response to the region information; a selecting unit configured to select, from the available frequency information list, a frequency to be used as a use frequency; and a controlling unit configured to control the communication function unit to use the use frequency.

[0008] This communication device can store and retain the region information indicating the range of movement planned for the own device. Subsequently, the inquiry regarding an available frequency is made, by being accompanied with the region information, to the database, and from the database, the available frequency information list indicating the frequencies usable in common in the entire range indicated by the region information, is obtained. Accordingly, the frequency to be used can be selected from the available frequency information list. Specifically, since the inquiry accompanied with the region information indicating the range of movement planned for the own device is previously conducted so that it is possible to deal with the case where the communication device is moved, the use frequency selected as a result of the inquiry corresponds to a frequency which is available in the entire region in which the communication device is planned to be moved. Therefore, when the communication device is moved, a compulsory switching of the use frequency does not occur, resulting in that an advantageous selection of the use frequency is realized.

[0009] ~~Further, According to a second aspect of the present invention, there is provided a communication control method as another aspect of the present invention is a communication control method~~ in a communication device having a

communication function unit, the communication control method including: storing and retaining region information indicating a range of movement planned for own device; transmitting the region information to a database; receiving an available frequency information list indicating frequencies usable in common in an entire range indicated by the region information, the available frequency information list being sent from the database as information in response to the region information; selecting, from the available frequency information list, a frequency to be used as a use frequency; and controlling the communication function unit to use the use frequency.

[0010] This communication control method is a control method complying with the above-described communication device.

[0011] ~~Further, According to a third aspect of the present invention, there is provided a database as still another aspect of the present invention includes:~~ including a storing unit configured to store and retain information of frequencies usable in each of meshes obtained by dividing a geographical region under administrative control, as available frequency information classified by mesh; a receiving unit configured to receive, from a communication device, region information indicating a range of movement planned for the communication device; a specifying unit configured to specify, by examining, based on the region information, that which meshes out of the meshes correspond to a region indicated by the region information, meshes corresponding thereto as region-equivalent meshes; a generating unit configured to generate, based on the available frequency information classified by mesh, a list indicating frequencies usable in common in all of the region-equivalent meshes, as an available frequency information list; and a providing unit configured to provide the available frequency information list to the communication device.

[0012] This database is a database which provides the information regarding the available frequencies to the above-described communication device, and includes a configuration for generating the information of the available frequencies in response to the region information indicating the range of movement planned for the communication device. Specifically, the information of frequencies usable in each of the meshes obtained by dividing the geographical region under administrative control, is first stored and retained as the available frequency

information classified by mesh. Subsequently, when the database receives, from the communication device, the region information indicating the range of movement planned for the communication device, it examines that which meshes correspond to the region indicated by the region information, and specifies the corresponding meshes as the region-equivalent meshes. Then, the database generates, based on the available frequency information classified by mesh, the list indicating the frequencies usable in common in all of the region-equivalent meshes, as the available frequency information list, and provides the list to the communication device.

[0013] An operation to be performed thereafter in the communication device is the same as that described above, and in the communication device, a compulsory switching of the use frequency does not occur when the communication device is moved, which realizes an advantageous selection of the use frequency.

[0014] ~~Further,~~ According to a fourth aspect of the present invention, there is provided a database control method ~~as yet another aspect of the present invention includes:~~ including storing and retaining information of frequencies usable in each of meshes obtained by dividing a geographical region under administrative control, as available frequency information classified by mesh; receiving, from a communication device, region information indicating a range of movement planned for the communication device; specifying, by examining, based on the region information, that which meshes out of the meshes correspond to a region indicated by the region information, meshes corresponding thereto as region-equivalent meshes; generating, based on the available frequency information classified by mesh, a list indicating frequencies usable in common in all of the region-equivalent meshes, as an available frequency information list; and providing the available frequency information list to the communication device.

[0015] This database control method is a control method complying with the above-described database.

EFFECT OF THE INVENTION

[0016] According to embodiments of the present invention, it is possible to provide, in a communication device being a terminal configured to operate under a television white space environment, a communication control method of the communication device, a database which provides information to the communication device, and a database control method, a communication