those frequencies. The master device knows its location and is authorized to receive from the database available frequencies based on location. The master device may then provide the available frequencies to associated white space devices (also referred to as slaves), so that the white space devices can transmit on the available frequencies.

~~[003a] In an aspect, an apparatus is provided, comprising at least one processor; and at least one memory including computer program code, the at least one memory and the computer program code configured to, with the at least one processor, cause the apparatus to perform at least the following:~~

~~sending a request to a server including a white space database, wherein the server is located at a first address; and~~

~~receiving a response to the request, the response including at least one of an identity of the server or a second address for accessing at least one of the server or another server including another white space database.~~

~~[003b] In another aspect, an apparatus is provided, comprising means for sending a request to a server including a white space database, wherein the server is located at a first address; and means for receiving a response to the request, the response including at least one of an identity of the server or a second address for accessing at least one of the server or another server including another white space database.~~

~~[003c] In yet another aspect, a computer-readable medium including computer-program code which when executed by at least one processor provides operations comprising:~~

~~sending a request to a server including a white space database, wherein the server is located at a first address; and~~

~~receiving a response to the request, the response including at least one of an identity of the server or a second address for accessing at least one of the server or another server including another white space database.~~

[004] The white space device may comprise a radio that is a so-called "slave" device because it may not know its location (even though it may have a location determination capability, this capability may not function or may be inoperative) or the slave does not have the necessary functionality to communicate to an authorized database configured to provide available frequencies. Instead, the slave relies on the master device to obtain available frequency/channel information obtained from the database. For example, the white space device (or slave) may check for available frequencies by requesting the available frequencies from the master device serving the slave. Next, the master provides to the database a request for available frequencies and location information (representative of the location of the master device). The database returns to the master the available white space frequencies and optionally maximum transmit powers for the given location. Next, the master delivers the available frequencies and/or maximum transmit powers to the slave. The slave device may then operate on any of the available frequencies provided by the master, so long as the slave remains within range of the master. In the case of the FCC, the slave may use the available frequencies provided by the master, so long as the slave receives a contact verification signal (CVS) transmitted by the master device.

SUMMARY

[005] Methods and apparatus, including computer program products, are provided for white space database discovery. In one aspect there is provided a method. The method may include sending, by a user equipment, a request to a server including

a white space database, wherein the server is located at a first address; and receiving, at the user equipment, a response to the request, the response including at least one of an identity of the server or a second address for accessing at least one of the server or another server including another white space database.

[005a] According to a first aspect, a method comprising: sending, by a user equipment, a request to a server including a white space database, wherein the server is located at a first address; and receiving, at the user equipment, a response to the request, the response including a white space database update message indicating a change or update of the first address to a second address, the second address for accessing the server or another server including another white space database.

[005b] According to a second aspect, an apparatus comprising: at least one processor; and at least one memory including computer program code, the at least one memory and the computer program code configured to, with the at least one processor, cause the apparatus to perform at least the following: sending a request to a server including a white space database, wherein the server is located at a first address; and receiving a response to the request, the response including a white space database update message indicating a change or update of the first addresses to a second address, the second address for accessing at least one of the server or another server including another white space database.

[006] In some variations of some of the embodiments disclosed herein, one or more of the features disclosed herein including following may be included. The response may further include a time representative of when the second address is accessible to obtain an allocation of a white space frequency. The time may represent a start time when the other server is accessible to allocate the white space frequency. The time may represent a start time when the server is not able to allocate the white space frequency due to at least one of a permanent or a temporary closure of the

server. The response may further include an indication of whether the first address is to be replaced with the second address. The request may include an indication requesting a list of certified white space databases. The request may include an indication to the server to provide at least one address for at least one white space database. The request may include an indication for the server to respond with one or more addresses corresponding to one or more white space databases associated with a regulatory domain. The response may include a plurality of addresses for a plurality of white space databases. The response may include at least one of registration information associated with the second address in the response or authorization information associated with the second address in the response. The registration information may represent whether the other server requires registration, and wherein the authorization information includes at least one of a first information representative of whether the other server requires authentication or a second information representative of a type of credential required by the other server. The server may include at least one of a provisioning server or a regulatory server, wherein the provisioning server may be

WHAT IS CLAIMED:

1. A method comprising:

sending, by a user equipment, a request to a server including a white space database, wherein the server is located at a first address; and

receiving, at the user equipment, a response to the request, ~~the response including at least one of an identity of the server or a second address for accessing at least one of the server or another server including another white space database~~ the response including a white space database update message indicating a change or update of the first address to a second address, the second address for accessing the server or another server including another white space database.

2. The method of claim 1, wherein the response further includes a time representative of when the second address is accessible to obtain an allocation of a white space frequency, or when the first address is not available.

3. The method of claim 12, wherein ~~the time represents a start time when the other server is accessible to allocate the white space frequency, or the time represents a start time when the server is not able to allocate the white space frequency due to at least one of a permanent or a temporary closure of the server~~ the request is one of a INIT REQ, a AVAIL SPECTRUM REQ, a AVAIL SPECTRUM BATCH REQ, and a registration message.

4. The method of claim 3, wherein the request includes a white space related information parameter.

5.4. A method as in claims 1-3, wherein the response further includes an indication of whether the first address is to be replaced with the second address.

6.5. A method as in claims 1-4, wherein the ~~request includes an indication requesting a list of certified white space databases~~response is one of a INIT RESP, a AVAIL SPECTRUM RESP, a AVAIL SPECTRUM BATCH RESP and a registration response message.

6. A method as in claims 1-5, wherein the request includes an indication to the server to provide at least one address for at least one white space database.

7. A method as in claims 1-6, wherein the request contains an indication for the server to respond with one or more addresses corresponding to one or more white space databases associated with a regulatory domainthe first and second addresses are database URIs.

8. A method as in claims 1-7, wherein the response includes a plurality of addresses for a plurality of white space databases.

9. A method as in claims 1-8, wherein the response further includes at least one of registration information associated with the second address in the response or authorization information associated with the second address in the response.

10. The method of claim 9, wherein the registration information represents whether the other server requires registration, and wherein the authorization information includes at least one of a first information representative of whether the other server requires authentication or a second information representative of a type of credential required by the other server.

11. A method as in claims 1-10, wherein the server comprises at least one of a provisioning server or a regulatory server, wherein the provisioning server is maintained by a manufacturer of the user equipment to provide the response including addresses of white space databases available and authorized to allocate white space frequencies to the user equipment, and wherein the regulatory server is maintained by a regulator of white space frequencies in a regulatory domain covered by the user equipment.

12. An apparatus comprising:

at least one processor; and

at least one memory including computer program code, the at least one memory and the computer program code configured to, with the at least one processor, cause the apparatus to perform at least the following:

sending a request to a server including a white space database, wherein the server is located at a first address; and

receiving a response to the request, the response including a white space database update message indicating a change or update of the first addresses to a second address, the second address for accessing at least one of the server or another server including another white space database ~~the response including at least one of an identity of the server or a second address for accessing at least one of the server or another server including another white space database~~.

13. The apparatus of claim 12, wherein the response further includes a time representative of when the second address is accessible to obtain an allocation of a white space frequency, or when the first address is not available.

14. The apparatus of claim 12, wherein the request is one of a INIT REQ, a AVAIL SPECTRUM REQ, a AVAIL SPECTRUM BATCH REQ, and a registration message ~~the time represents a start time when the other server is accessible to allocate the white space frequency, or, the time represents a start time when the server is not able to allocate the white space frequency due to at least one of a permanent or a temporary closure of the server~~.

15. The apparatus of claim 14, wherein the request includes a white space related information parameter.

1615. An apparatus as in claims 12-14, wherein the response is one of a INIT RESP, a AVAIL SPECTRUM RESP, a AVAIL SPECTRUM BATCH RESP, and a registration response message further includes an indication of whether the first address is to be replaced with the second address.

1716. An apparatus as in claims 12-15, wherein the first and second addresses are database URIs request includes an indication requesting a list of certified white space databases.

~~17. An apparatus as in claims 12-16, wherein the request includes an indication to the server to provide at least one address for at least one white space database.~~

18. An apparatus as in claims 12-~~17~~, wherein the request contains an indication for the server to respond with one or more addresses corresponding to one or more white space databases associated with a regulatory domain.

19. An apparatus as in claims 12-~~18~~, wherein the response includes a plurality of addresses for a plurality of white space databases.

20. An apparatus as in claims 12-~~19~~, wherein the response further includes at least one of registration information associated with the second address in the response or authorization information associated with the second address in the response.

21. The apparatus of claim 20, wherein the registration information represents whether the other server requires registration, and wherein the authorization information includes at least one of a first information representative of whether the other server requires authentication or a second information representative of a type of credential required by the other server.

22. An apparatus as in claims 12-~~21~~, wherein the server comprises at least one of a provisioning server or a regulatory server, wherein the provisioning server is maintained by a manufacturer of the apparatus to provide the response including addresses of white space databases available and authorized to allocate white space frequencies to the apparatus, and wherein the regulatory server is maintained by a regulator of white space frequencies in a regulatory domain covered by the apparatus.